



OPERATOR'S AND PARTS MANUAL

655 ROCK TRENCHER



PALADIN
LIGHT CONSTRUCTION GROUP



The Power of Combined Excellence

SKID STEER APPLICATIONS



SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: OM816
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PREFACE

GENERAL COMMENTS

Congratulations on the purchase of your new BRADCO product! This product was carefully designed and manufactured to give you many years of dependable service. Only minor maintenance (such as cleaning and lubricating) is required to keep it in top working condition. Be sure to observe all maintenance procedures and safety precautions in this manual and on any safety decals located on the product and on any equipment on which the attachment is mounted.

This manual has been designed to help you do a better, safer job. Read this manual carefully and become familiar with its contents.

WARNING! Never let anyone operate this unit without reading the "Safety Precautions" and "Operating Instructions" sections of this manual.



Always choose hard, level ground to park the vehicle on and set the brake so the unit cannot roll.

Unless noted otherwise, right and left sides are determined from the operator's control position when facing the attachment.

NOTE: The illustrations and data used in this manual were current (according to the information available to us) at the time of printing, however, we reserve the right to redesign and change the attachment as may be necessary without notification.

BEFORE OPERATION

The primary responsibility for safety with this equipment falls to the operator. Make sure the equipment is operated only by trained individuals that have read and understand this manual. If there is any portion of this manual or function you do not understand, contact your local authorized dealer or the manufacturer to obtain further assistance. Keep this manual available for reference. Provide the manual to any new owners and/or operator's

SAFETY ALERT SYMBOL



This is the "Safety Alert Symbol" used by this industry. This symbol is used to warn of possible injury. Be sure to read all warnings carefully. They are included for your safety and for the safety of others working with you.

SERVICE

Use only manufacturer replacement parts. Substitute parts may not meet the required standards.

Record the model and serial number of your unit on the cover of this manual. The parts department needs this information to insure that you receive the correct parts.

SOUND AND VIBRATION

Sound pressure levels and vibration data for this attachment are influenced by many different parameters: some items are listed below (not inclusive):

- prime mover type, age, condition, with or without cab enclosure and configuration
- operator training, behavior, stress level
- job site organization, working material condition, environment

Based on the uncertainty of the prime mover, operator, and job site, it is not possible to get precise machine and operator sound pressure levels or vibration levels for this attachment.

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SAFETY STATEMENTS



THIS SYMBOL BY ITSELF OR WITH A WARNING WORD THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY OR THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.



DANGER

THIS SIGNAL WORD IS USED WHERE SERIOUS INJURY OR DEATH WILL RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.



WARNING

THIS SIGNAL WORD IS USED WHERE SERIOUS INJURY OR DEATH COULD RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.



CAUTION

THIS SIGNAL WORD IS USED WHERE MINOR INJURY COULD RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.

NOTICE

NOTICE INDICATES A PROPERTY DAMAGE MESSAGE.

GENERAL SAFETY PRECAUTIONS

WARNING!

READ MANUAL PRIOR TO INSTALLATION



Improper installation, operation, or maintenance of this equipment could result in serious injury or death. Operators and maintenance personnel should read this manual, as well as all manuals related to this equipment and the prime mover thoroughly before beginning installation, operation, or maintenance. **FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND THE PRIME MOVER'S MANUAL(S).**



READ AND UNDERSTAND ALL SAFETY STATEMENTS

Read all safety decals and safety statements in all manuals prior to operating or working on this equipment. Know and obey all OSHA regulations, local laws, and other professional guidelines for your operation. Know and follow good work practices when assembling, maintaining, repairing, mounting, removing, or operating this equipment.



KNOW YOUR EQUIPMENT

Know your equipment's capabilities, dimensions, and operations before operating. Visually inspect your equipment before you start, and never operate equipment that is not in proper working order with all safety devices intact. Check all hardware to ensure it is tight. Make certain that all locking pins, latches, and connection devices are properly installed and secured. Remove and replace any damaged, fatigued, or excessively worn parts. Make certain all safety decals are in place and are legible. Keep decals clean, and replace them if they become worn or hard to read.

GENERAL SAFETY PRECAUTIONS

WARNING!



PROTECT AGAINST FLYING DEBRIS

Always wear proper safety glasses, goggles, or a face shield when driving pins in or out, or when any operation causes dust, flying debris, or any other hazardous material.

WARNING!



LOWER OR SUPPORT RAISED EQUIPMENT

Do not work under raised booms without supporting them. Do not use support material made of concrete blocks, logs, buckets, barrels, or any other material that could suddenly collapse or shift positions. Make sure support material is solid, not decayed, warped, twisted, or tapered. Lower booms to ground level or on blocks. Lower booms and attachments to the ground before leaving the cab or operator's station.

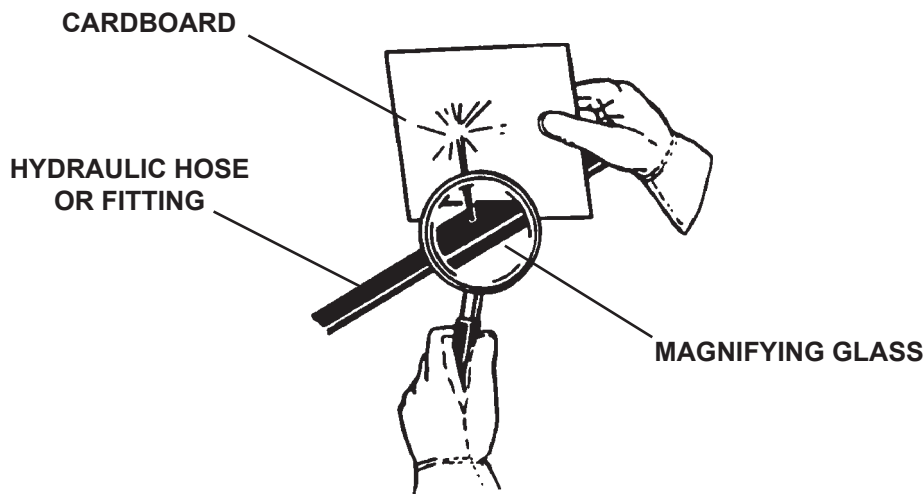
WARNING!



USE CARE WITH HYDRAULIC FLUID PRESSURE

Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death. Hydraulic leaks under pressure may not be visible. Before connecting or disconnecting hydraulic hoses, read your prime mover's operator's manual for detailed instructions on connecting and disconnecting hydraulic hoses or fittings.

- Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.
- If injured by injected fluid, see a doctor at once. If your doctor is not familiar with this type of injury, ask him to research it immediately to determine proper treatment.
- Wear safety glasses, protective clothing, and use a piece of cardboard or wood when searching for hydraulic leaks. **DO NOT USE YOUR HANDS!** **SEE ILLUSTRATION.**



GENERAL SAFETY PRECAUTIONS

WARNING!



DO NOT MODIFY MACHINE OR ATTACHMENTS

Modifications may weaken the integrity of the attachment and may impair the function, safety, life, and performance of the attachment. When making repairs, use only the manufacturer's genuine parts, following authorized instructions. Other parts may be substandard in fit and quality. Never modify any ROPS (Roll Over Protection Structure) or FOPS (Falling Object Protective Structure) equipment or device. Any modifications must be authorized in writing by the manufacturer.

WARNING!



SAFELY MAINTAIN AND REPAIR EQUIPMENT

- Do not wear loose clothing or any accessories that can catch in moving parts. If you have long hair, cover or secure it so that it does not become entangled in the equipment.
- Work on a level surface in a well-lit area.
- Use properly grounded electrical outlets and tools.
- Use the correct tools for the job at hand. Make sure they are in good condition for the task required.
- Wear the protective equipment specified by the tool manufacturer.



SAFELY OPERATE EQUIPMENT

Do not operate equipment until you are completely trained by a qualified operator in how to use the controls, know its capabilities, dimensions, and all safety requirements. See your machine's manual for these instructions.

- Keep all step plates, grab bars, pedals, and controls free of dirt, grease, debris, and oil.
- Never allow anyone to be around the equipment when it is operating.
- Do not allow riders on the attachment or the prime mover.
- Do not operate the equipment from anywhere other than the correct operator's position.
- Never leave equipment unattended with the engine running, or with this attachment in a raised position.
- Do not alter or remove any safety feature from the prime mover or this attachment.
- Know your work site safety rules as well as traffic rules and flow. When in doubt on any safety issue, contact your supervisor or safety coordinator for an explanation.

EQUIPMENT SAFETY PRECAUTIONS

WARNING!



KNOW WHERE UTILITIES ARE

Observe overhead electrical and other utility lines. Be sure equipment will clear them. When digging, call your local utilities for location of buried utility lines, gas, water, and sewer, as well as any other hazard you may encounter.

WARNING!



EXPOSURE TO RESPIRABLE CRYSTALLINE SILICA DUST ALONG WITH OTHER HAZARDOUS DUSTS MAY CAUSE SERIOUS OR FATAL RESPIRATORY DISEASE.

It is recommended to use dust suppression, dust collection and if necessary personal protective equipment during the operation of any attachment that may cause high levels of dust.

WARNING!



REMOVE PAINT BEFORE WELDING OR HEATING

Hazardous fumes/dust can be generated when paint is heated by welding, soldering or using a torch. Do all work outside or in a well ventilated area and dispose of paint and solvent properly. Remove paint before welding or heating.

When sanding or grinding paint, avoid breathing the dust. Wear an approved respirator. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

WARNING!



END OF LIFE DISPOSAL

At the completion of the useful life of the unit, drain all fluids and dismantle by separating the different materials (rubber, steel, plastic, etc.). Follow all federal, state and local regulations for recycling and disposal of the fluid and components.



OPERATING THE TRENCHER

- Block off work area from bystanders, livestock, etc. Stop operation if bystanders or livestock enter the work area.
- Operate only from the operator's station.
- Never drop a boom with a rapidly moving digging chain on the ground. The force of the trencher may cause the vehicle to move suddenly and unexpectedly.
- Use caution when operating on slopes. The natural vibration will cause the unit to creep sideways downhill. Try to dig with trencher in a level position.
- Do not adjust relief valve settings. Incorrect valve settings could result in equipment damage and/or personal injury.
- An operator must not use drugs or alcohol, which can change his or her alertness or coordination. An operator taking prescription or over-the-counter drugs should seek medical advice on whether or not he or she can safely operate equipment.
- Before exiting the prime mover, lower the unit to the ground, turn off the prime mover's engine, remove the key and apply the brakes.
- Do not use the trencher crumber bar or chain as a step when climbing in or out of the prime mover.
- Be alert to changes in the work area. Watch out for bystanders, changes in weather and soil conditions.

EQUIPMENT SAFETY PRECAUTIONS



OPERATING THE TRENCHER

- Do not make sharp turns while trenching. Trencher could become wedged in the trench and damaged.
- Keep equipment and bystanders away from the trencher after it has been dug. The weight could cause a cave in.
- If chain becomes jammed, never attempt to free it while the unit is running. Stop the unit, shut off the engine and review the situation.



TRANSPORTING THE TRENCHER

- When driving on public roads use safety lights, reflectors, Slow Moving Vehicle signs etc., to prevent accidents. Check local government regulations that may affect you.
- Do not drive close to ditches, excavations, etc., cave in could result.
- Do not smoke when refueling the prime mover. Allow room in the fuel tank for expansion. Wipe up any spilled fuel. Secure cap tightly when done.
- When transporting keep the trencher as low as the terrain will allow.



MAINTAINING THE TRENCHER

- Before performing maintenance, lower the attachment to the ground, turn off the engine, remove the key and apply the brakes.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator service manuals before any repair is made. After completing maintenance or repair, check for correct functioning of the backhoe. If not functioning properly, always tag "DO NOT OPERATE" until all problems are corrected.
- Worn, damaged, or illegible safety decals must be replaced. New safety decals can be ordered from BRADCO.
- Never make hydraulic repairs while the system is under pressure. Serious personal injury or death could result.
- Never work under a raised attachment.
- Replace all safety shields and guards when done performing maintenance. Do not operate trencher with protective equipment removed.

PREOPERATION

655 ROCK TRENCHER

GENERAL INFORMATION

The purpose of this manual is to assist in setting up, operating and maintaining your trencher. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance.

Right and left when referred to in this manual are determined by the operator's right and left when seated at the prime mover controls in the normal operating position facing forward.

The illustrations and data used in this manual were current at the time of printing, however, we reserve the right to redesign and change the trenchers as may be necessary without notification.

PREPARING THE PRIME MOVER

WARNING! Never let anyone operate this prime mover and trencher without understanding all of the "Safety Precautions" and "Operating Instructions" located in this manual. Always choose hard, level ground to park the prime mover on and set the brake so that the prime mover cannot roll.



Check to ensure that the prime mover is equipped with high flow auxiliary hydraulics and that a case drain line has been installed going directly to the reservoir tank.

NOTE: High flow auxiliary hydraulics is considered optional equipment on most skid steer loaders. If your skid steer loader is not equipped with high flow auxiliary hydraulics, consult your skid steer dealer for information on availability.

The 655 trencher was designed to be easy to use and maintain. The trencher mounts to the toolbar/attachment plate of the skid steer. The mount incorporates the quick attach mechanism of the skid-steer for fast, easy mounting.

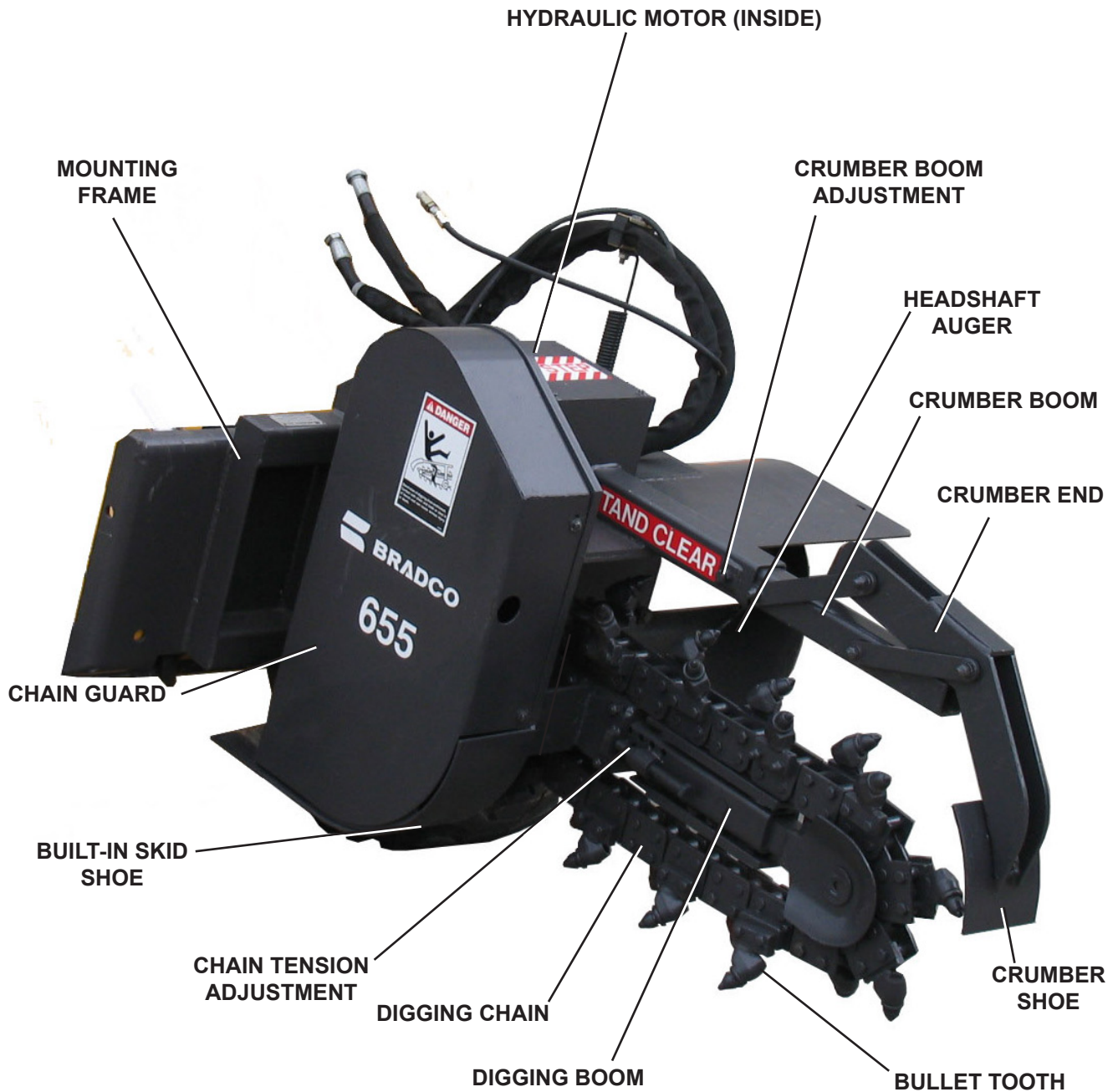
The trencher is powered by the skid steer's auxiliary hydraulic system. Your skid-steer **MUST** have a high flow auxiliary hydraulic system to run the 655 trencher.

PREOPERATION

655 ROCK TRENCHER

GENERAL INFORMATION

The purpose of this page is to acquaint you with the 655 trencher and the names of its various components. This knowledge will be helpful when reading through this manual or when ordering service parts.



SAFETY DECAL PLACEMENT

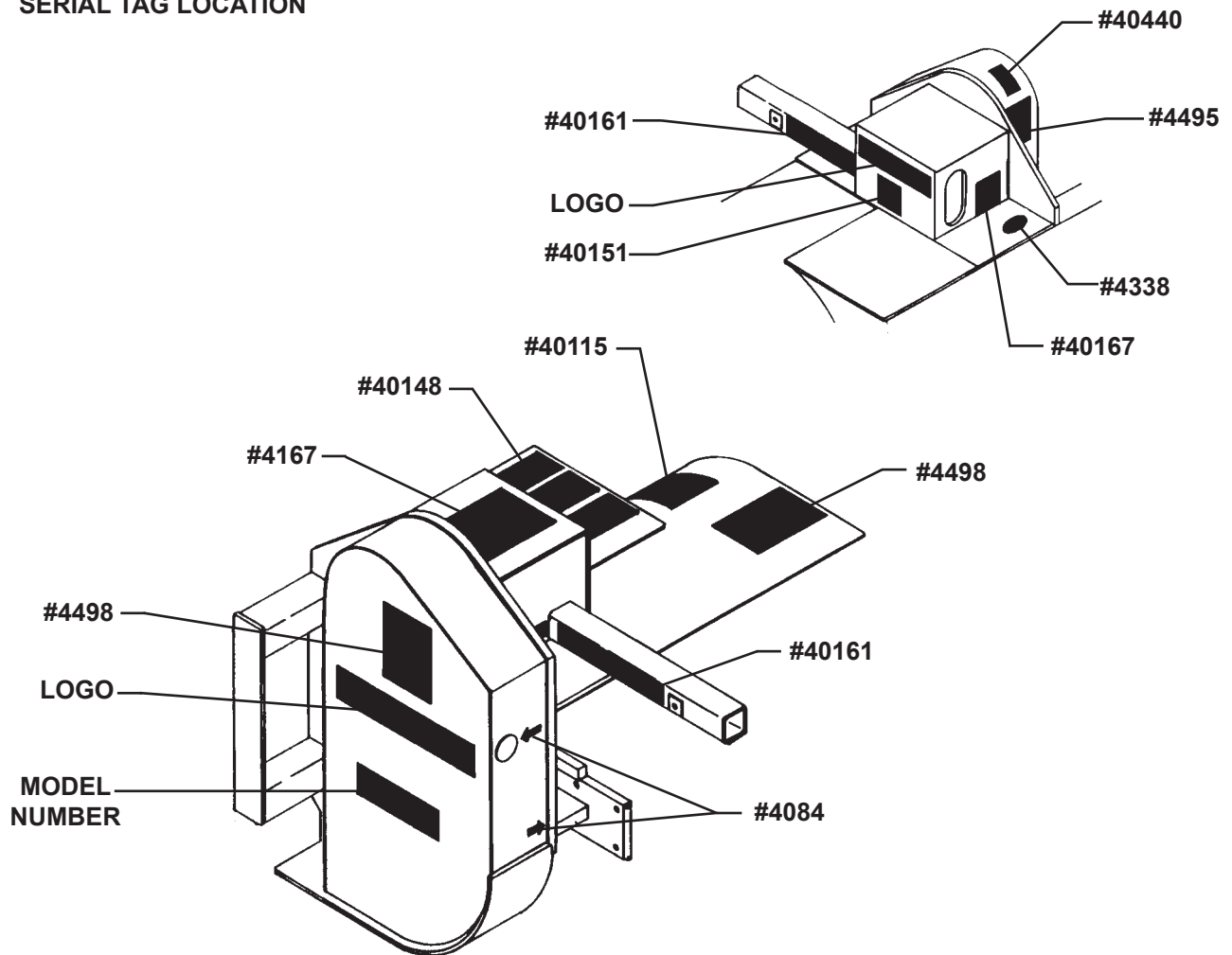
GENERAL INFORMATION

The following diagrams show the location of all the decals used on your attachment. The decals are identified by their part numbers, with the reductions of the actual decals shown on the following pages. Use this information to order replacements for lost or damaged decals. Be sure you understand all decals before operating the attachment. They contain information you need to know for attachment safety.


IMPORTANT: Keep all safety decals clean and legible. Replace all missing, or damaged safety decals. When replacing parts with safety decals attached, the safety decals must also be replaced.

REPLACING SAFETY DECALS: Clean the area of application with a nonflammable solvent, then wash the same area with soap and water. Allow the surface to dry. Remove the backing from the safety decal, exposing the adhesive surface. Apply the safety decal to the position shown in the diagram, and smooth out any bubbles.

SERIAL TAG LOCATION



DECALS



WARNING

READ THE TRENCHER OPERATOR'S MANUAL BEFORE YOU USE THE TRENCHER.

USE TRENCHER ONLY WITH A LOADER IDENTIFIED IN TRENCHER OPERATOR'S MANUAL. READ THE LOADER OPERATOR'S MANUAL.

BYSTANDERS MUST BE AT LEAST 6 FEET (2 METERS) OR MORE AWAY FROM THE TRENCHER DURING OPERATION.

OPERATION OF THE TRENCHER MUST BE DONE ONLY FROM THE OPERATOR'S SEAT OF THE SKID STEER.

ALWAYS LOWER THE TRENCHER TO THE GROUND AND SHUT ENGINE OFF BEFORE LEAVING THE OPERATOR'S SEAT.

DO NOT OPERATE TRENCHER WITH CHAIN GUARDS REMOVED.

ALWAYS CHECK FOR BURIED FACILITIES BEFORE TRENCHING.

NEVER TRY TO REMOVE ROCKS FROM DIGGING CHAIN WITH CHAIN RUNNING.

FAILURE TO OBEY WARNINGS MAY CAUSE INJURY OR DEATH.



**PART #40440
CALL BEFORE
YOU DIG**

**PART #40115
WARNING! GENERAL**



DANGER



Stand clear of digging chain and trench. Contact with chain and teeth or cave in of trench wall can cause serious injury or death.

**PART #4498
DANGER!**



WARNING






KEEP AWAY

HIGH-PRESSURE FLUID HAZARD
To prevent serious injury or death:

- Relieve pressure on system before repairing or adjusting or disconnecting.
- Wear proper hand and eye protection when searching for leaks. Use wood or cardboard instead of hands.
- Keep all components in good repair.

**PART #40151
WARNING! HIGH PRESSURE FLUID**

STAND CLEAR

**PART #40161
STAND CLEAR**

DECALS



PART #4167
NO STEP



PART #40148
NON-SLIP SURFACE DECAL



PART #40167
CAUTION: CASE DRAIN



PART #4495
WARNING! GUARDS REMOVED



PART #4338
MADE IN USA



PART #4084
GREASE 8 HOURS

NOTE: CONTACT YOUR LOCAL DEALER FOR MODEL NUMBER AND LOGO DECALS.

INSTALLATION

GENERAL INFORMATION

The following instructions will help you mount your trencher onto your skid steer loader. The trenchers use the quick-attach system for ease of installation.

Remember to read all safety warnings, decals and operations instructions before operating the attachment. If there is any portion of this manual that you do not understand, contact your dealer.

IMPORTANT: PLEASE VERIFY HYDRAULIC FLOW COMPATIBILITY BETWEEN THE TRENCHER AND THE SKID STEER BEFORE INSTALLATION.

The 655 is a high flow trencher that requires a case drain line and **MUST NOT** be used on standard flow hydraulic systems due to unsatisfactory performance.

INSTALLATION INSTRUCTIONS

1. Remove shipping banding.
2. Remove any existing attachment from the loader.
3. Following all standard safety practices and the instructions for installing an attachment in your skid steer operator's manual, install the attachment onto your skid steer.

NOTE: IT IS IMPORTANT TO MAKE SURE THE LOCKING MECHANISM ON YOUR QUICK ATTACH IS ENGAGED, THEREFORE LOCKING THE ATTACHMENT ONTO THE SKID STEER

4. Lower the unit to the ground and remove the key.
5. Relieve pressure from the auxiliary hydraulic system. After making sure that there is not any foreign matter on the hydraulic couplers, connect the case drain coupler to the case drain on your skid steer loader. **NOTE: The case drain line must be connected first, then the power and return hoses. When disconnecting the hoses, it is recommended to disconnect the case drain line last.**
6. Connect the power and return hoses to the high flow auxiliary hydraulic system of your skid steer loader. Route the hoses in such a fashion as to avoid pinching or chafing.

NOTICE: BE SURE CASE DRAIN COUPLER IS COMPLETELY ENGAGED. IMMEDIATE HYDRAULIC MOTOR SEAL FAILURE WILL OCCUR IF CASE DRAIN IS NOT SUCCESSFULLY CONNECTED.

INSTALLATION

DISCONNECT INSTRUCTIONS

1. Lower the trencher to the ground.
2. Following Safety Shut Down Procedures; stop the engine and set the parking brake, relieve any pressure in the hydraulic lines.
3. Disconnect the power and return hoses from the auxiliary hydraulics. Disconnect the case drain line. NOTE: It is recommended to disconnect the case drain line last.
4. Following all standard safety practices and the instructions for disconnecting an attachment in your skid steer operator's manual, disconnect the trencher from your skid steer.
5. Connect the hydraulic couplers on the attachment together to prevent contaminants from entering the hydraulic system.

OPERATION

CONTROLS

655 TRENCHER

GENERAL INFORMATION

Simplicity of operation is one of the key features of the 655 trencher. The trenchers themselves have no controls, just a few adjustments to check. It is important however, to be familiar with, and know the controls and adjustments on both the trencher and the skid steer. Such knowledge is crucial for safe, efficient operation of equipment. Take the time to learn how they operate now.

SKID STEER

Your trencher mounts to the toolbar / attachment plate of the skid steer. Due to this arrangement, thorough knowledge of the skid steer controls is necessary for trencher operation. Read your skid steer owner's manual for information regarding skid steer operation before attempting to use the trencher.

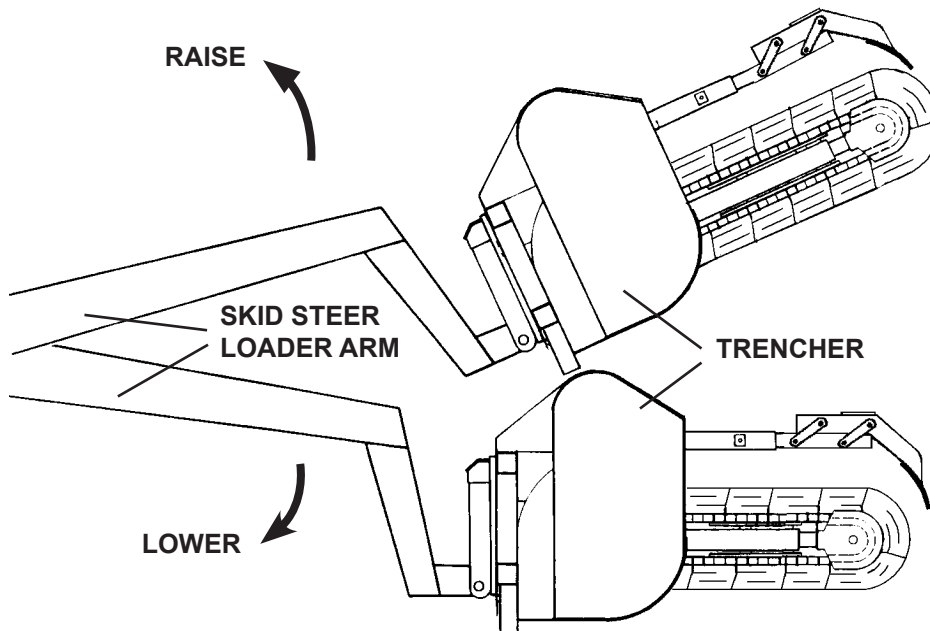
RAISING / LOWERING THE TRENCHER

Raise / lower the trencher unit by raising / lowering the skid steer loader arms through their appropriate skid steer controls. (See Figure #1)

CAUTION! Become aware of any overhead power or telephone lines, tree limbs, etc., that the raised trencher could come into contact with. Contact with electrical lines could cause serious injury or death.



FIGURE #1



OPERATION

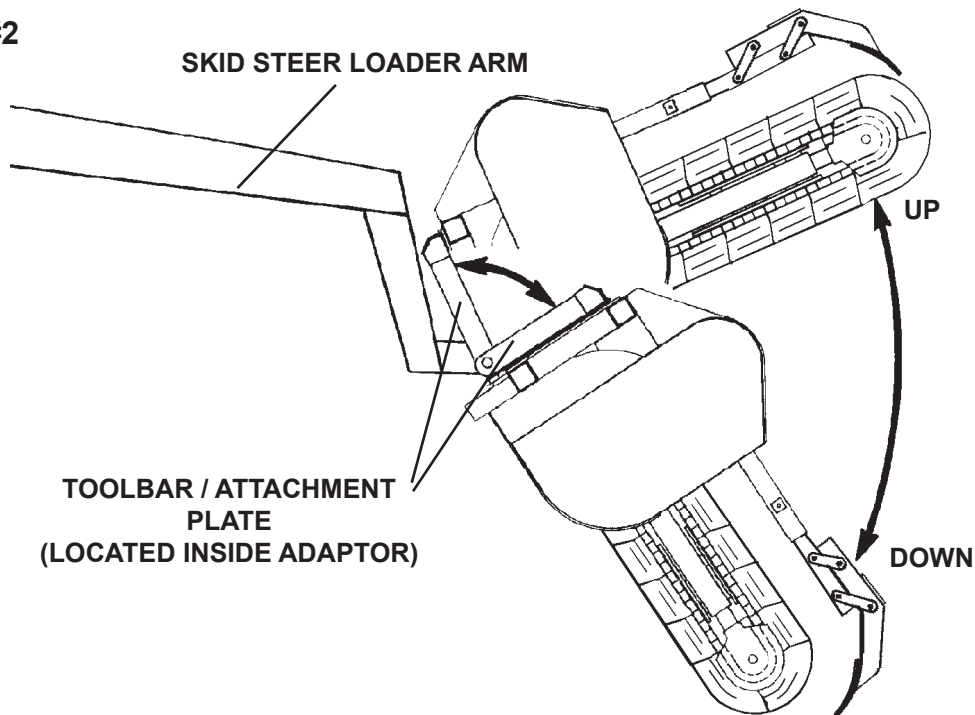
CONTROLS

655 TRENCHER

TILTING THE TRENCHER

Tilt the trencher unit up or down by tilting the toolbar / attachment plate back or forward through its skid steer control. We recommend a 60° digging angle for general trenching as measured from ground level (the horizon). (See Figure #2)

FIGURE #2



STARTING AND STOPPING THE TRENCHER

Power to the trencher is supplied by oil from the skid steer auxiliary hydraulic system, which passes through the hydraulic hoses and into the trencher's hydraulic motor.

The trencher unit itself does not have an on/off control but is operated by the skid steer auxiliary hydraulic control mechanism. To start the trencher, engage the auxiliary hydraulics. (See your skid steer owner's manual.) To stop the trencher, disengage the auxiliary hydraulics.

TRENCHER SPEED CONTROL

Again it may be noted that power to the trencher is supplied by the skid steer's auxiliary hydraulics. Trencher speed and power are determined by the flow of oil coming out of the auxiliary system, which in turn is dependent upon skid steer engine speed. To increase trencher speed, increase skid steer engine speed, to decrease trencher speed, decrease skid steer engine speed.

When first starting a trench throttle down the skid steer engine to half throttle. This will reduce the shock to the skid steer and trencher when the digging teeth first contact the ground. Once the trench is started, set the engine back to full throttle.

For general use operate the trencher with the skid steer engine at full throttle to provide maximum power to the auxiliary hydraulics and thus the trencher.

OPERATION

CONTROLS

655 TRENCHER

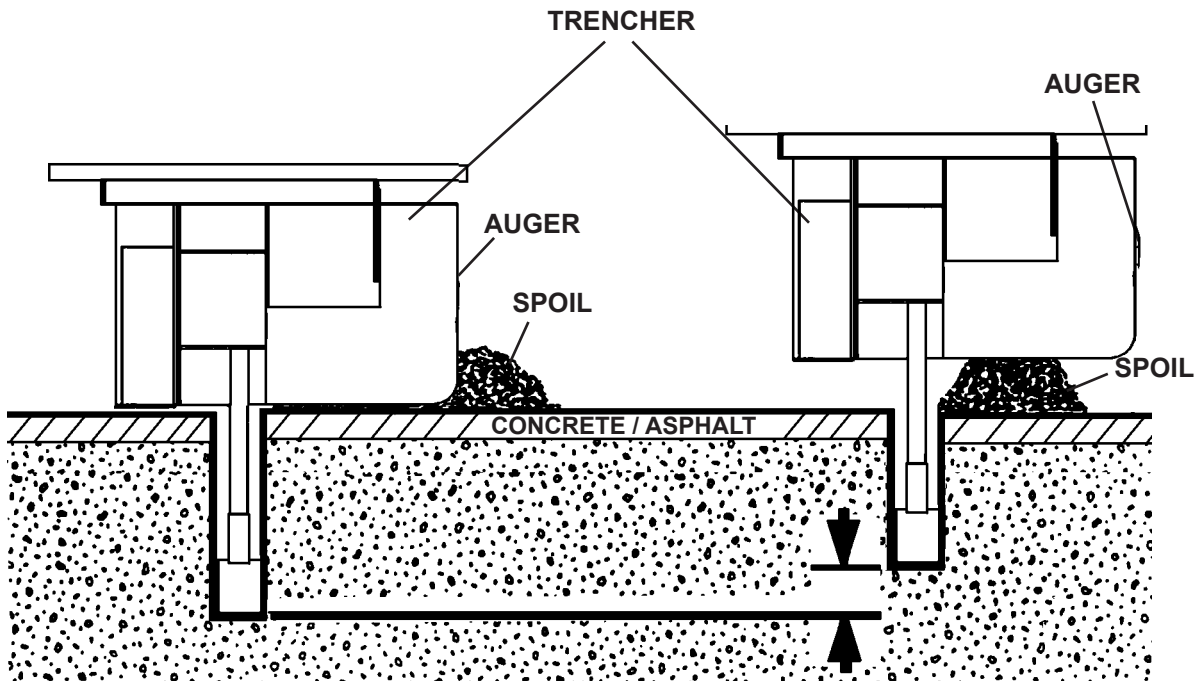
AUGER HEIGHT

The auger is fixed to the trencher mainframe and has no separate adjustment. To raise the auger, raise the trencher as previously described. This will raise the auger and thus leave the dirt or spoil closer to the trench.

Lowering the trencher will cause the auger to lower, moving the spoil away from the trench. The built-in skid shoe on the 655 trencher will prevent the auger from being lowered to the extent that the auger itself starts to dig in the ground as this will greatly reduce efficiency.

It should be noted that raising or lowering the trencher to change the auger height will also change the trenching depth. You will need to compensate for this by changing the tilt of the trencher down or up accordingly.

FIGURE #3



CRUMBER SHOE/BAR ADJUSTMENT

The purpose of the crumber shoe is to keep any loose dirt in the trench close enough to the digging chain so that the digging teeth can grab it and remove it. This will give you a cleaner finished trench. Your trencher has an adjustable crumber bar that can be lengthened or shortened to bring the crumber shoe closer or farther from the digging chain.

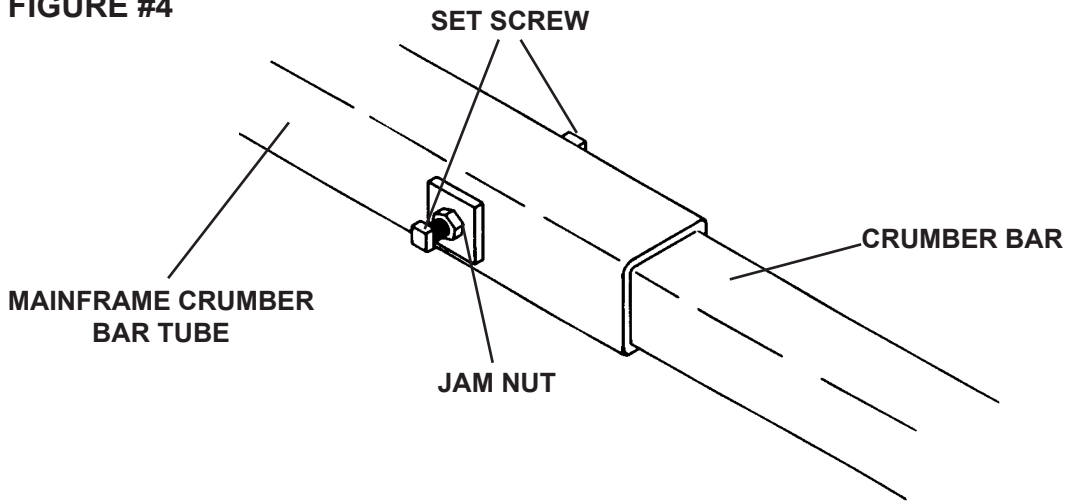
To adjust the crumber bar length, loosen the two jam nuts found at the end of the mainframe crumber bar tube. Slide the bar in or out to achieve the desired spacing (we suggest a distance of about 4" between crumber shoe and digging teeth for best overall results). Tighten the set screws and jam nuts when finished. (See Figure #4 on the next page)

OPERATION

CONTROLS

655 TRENCHER

FIGURE #4



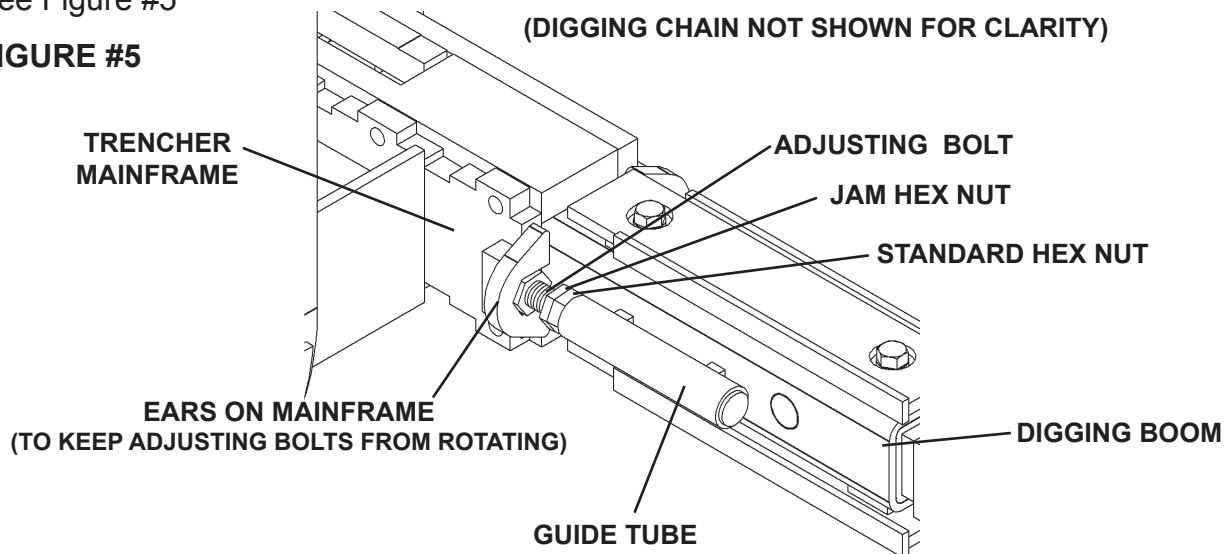
CHAIN TENSION ADJUSTMENT

When trenching, the digging chain tension should be adjusted so that the chain is as loose as possible, without jumping off the sprocket or idler wheel. To do this, an adjustment is provided on the digging boom.

Chain tension is maintained by a large spring located inside the boom and adjusted by moving the boom in or out of the boom clamp plates located at the trencher end of the boom.

These booms have an adjusting bolt on each side at the trencher end of the boom. The head of the bolts are kept from rotating by ears welded onto the mainframe. The end of the bolt rests in the ear while each bolt has a jam nut and a .75" hex nut on it. To tighten the chain, "back off" the jam nuts from the regular nuts. Now turn the standard nuts off the adjusting bolts. This will push the boom out and thus tighten the chain. Retighten the jam nut when finished. To loosen the chain, follow the same procedure, except turn the hex nut onto the adjusting bolt. See Figure #5

FIGURE #5



OPERATION

CONTROLS

655 TRENCHER

If chain runs off in rocky ground or large roots, tighten further. Chain tension is important to monitor since excessive tension will cause high wear rates on the chain and sprockets and less than enough tension will cause run off problems.

CAUTION! Never work on, or make adjustments to any part of the trencher while the unit is running. You could get caught in the digging teeth and be severely injured or killed.



It is common for your trencher to need its digging chain tightened after the first 10 to 20 minutes of operation as the chain and sprocket seat themselves.

DRIVE CHAIN ADJUSTMENT

Drive chain tension is maintained by a chain tightener and sprocket located inside the chain cover on the right side of your trencher.

Remove the four (4) .31" UNC X .75" capscrews on the chain cover and remove the chain cover to gain access to the drive chain.

CAUTION! Never work on, or make adjustments to any part of the trencher while the unit is running. You could get caught in the digging teeth or chain and be severely injured or killed.



It is common for your trencher to need its drive chain adjusted after the first eight (8) working hours of operation as the chain and sprocket seat themselves and after every one hundred (100) working hour interval thereafter.

NOTE: Chain is properly adjusted when the long side of chain can be moved by hand ½" either way from centerline of chain.

To adjust the drive chain:

Loosen the two (2) .75" UNC X 1.50" capscrews located on the chain tightener and rotate the chain tightener until the opposite side of chain can be moved by hand ½" either way from centerline.

Position chain cover into place and reinstall four (4) .31" UNC X .75" capscrews, lock washers and flat washers.

WARNING! Replace all safety covers and guards after performing maintenance. Never operate trencher with chain cover removed, serious injury or death may occur.



OPERATION

CONTROLS

655 TRENCHER

Chain tension is important to monitor since improper tension will cause high wear rates on the chain and sprockets.

IMPORTANT: When replacing the drive chain or drive sprockets on your trencher we recommend replacing all three sprockets and the drive chain at the same time to avoid excessive wear of replacement parts.

When replacing digging chain or digging sprockets on your trencher we recommend replacing all at the same time to avoid excessive wear of replacement part.

OPERATION

OPERATING TECHNIQUES

ROCK TRENCHER

INTENDED USE: This trencher is designed to dig holes and trenches up to the depth and width of your digging chain in rocky terrain. Use in any other way is considered contrary to the intended use.

GENERAL INFORMATION

The 655 Trencher was designed to cut an 8" trench through hard surfaces such as rock and asphalt for the installation of fiber optic cable. With the help of the information in this section and a little practice you should become proficient in its operation in no time. Observe the following points to obtain the best results with the least amount of wear on the machine. Read the "Safety Precautions" section of this manual before you begin.

CAUTION! Operate the trencher only when seated at the skid steer controls.



Do not operate the skid steer without proper ROPS (Roll-Over-Protective-Structure), seat belt, and hard hat.

Pay attention to the job at hand. Be alert to the possibilities of others in the work area.

Never let anyone work around, or perform maintenance on the trencher while it is running.

Always use a crumber assembly on the trencher.

BEFORE YOU START TRENCHING

Before any excavating is started, it is always a good idea to plan out the job first. Various things need to be considered and taken into account prior to the actual trenching. The operator should inspect the job site and take notice on any potential hazards in the area. He should have a complete understanding of the task he is expected to perform. Figure out what will be done with the spoil (excavated soil), will it be used to backfill or be trucked out? What are the ground conditions like? Will you have to work around others? Etc.

WARNING! Check the prospective trenching area for hidden utility lines before operating the trencher. Contacting a utility line with the trencher could cause electrocution resulting in death. Call all utility companies and have them plot out all their lines first. If you damage a utility line, shut off the equipment at once and contact the affected utility immediately.



Mark off the area to be trenched out. This can be done with powdered lime, chalk, or a guide string and stakes. Block off the area from all bystanders if possible.

STARTING THE TRENCH

Position the skid steer with the trencher boom directly over the center of the trench layout. It will take about 4' of trenching (depending on terrain) before the trencher will be able to operate at the desired level, so plan for this and position the trencher about 4' behind where you want the actual trench to start.

OPERATION

OPERATING TECHNIQUES

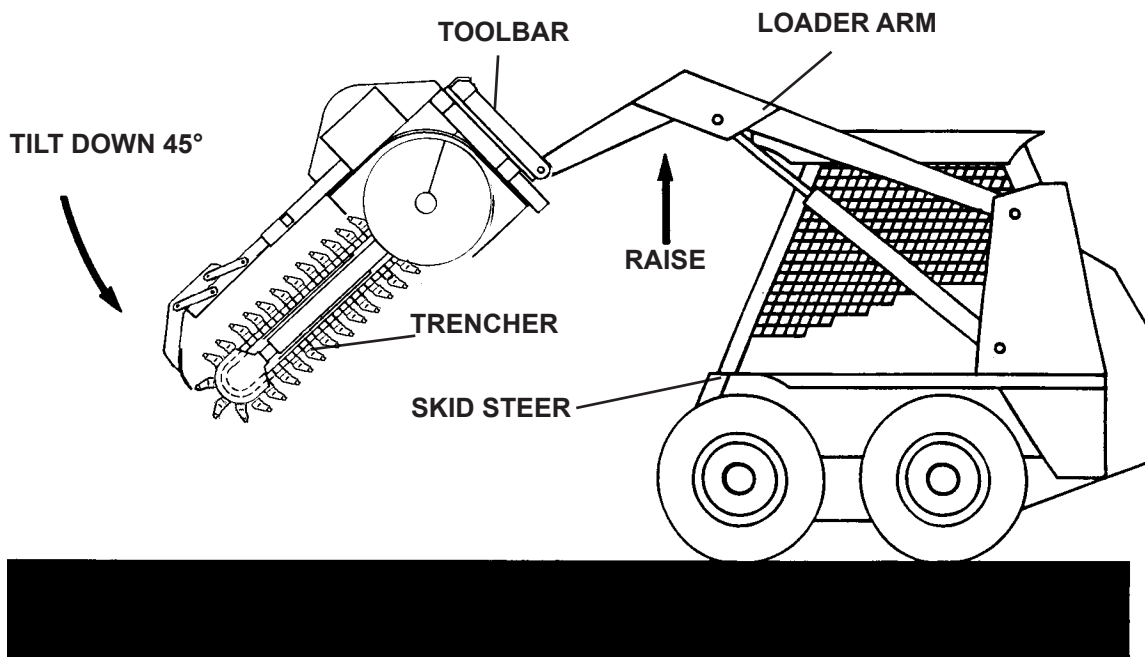
ROCK TRENCHER

NOTE: The skid steer is driven in reverse when trenching. You cannot trench driving the skid steer forward.

Raise the trencher with the skid steer loader arms and tilt the trencher at a 45° angle. (See Figure #6) Position the unit so that the digging teeth are just above ground level.

Set the skid steer throttle at half speed. Start the digging chain by engaging the skid steer auxiliary hydraulic system.

FIGURE #6



CAUTION! When lowering a moving digging chain to the ground the force of the teeth grabbing the ground will try to pull the trencher suddenly forward. Be prepared. Have the brake on the skid steer set to help counteract the force.



Slowly lower the digging chain into the ground to start the trench. Do this by lowering the trencher with the loader arms. Continue lowering the unit until the crumber end rolls all the way back on the crumber bar (See Figure #7)

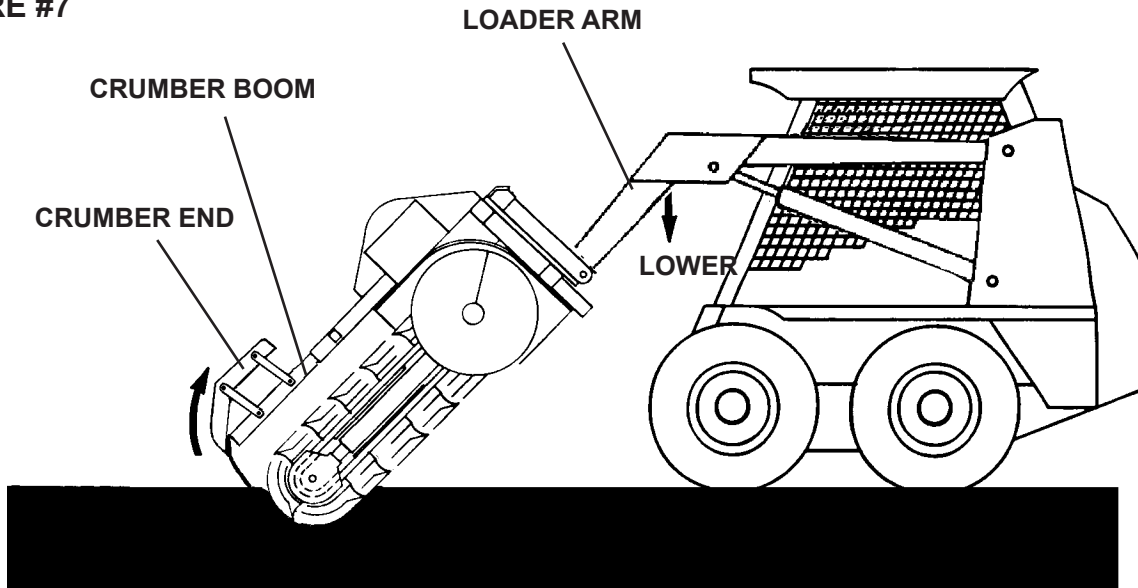
IMPORTANT: After the crumber end has rolled all the way back, do not lower the trencher any farther without moving the skid steer in reverse. Failure to do so could result in bending of the crumber boom, which is not covered by warranty.

OPERATION

OPERATING TECHNIQUES

ROCK TRENCHER

FIGURE #7

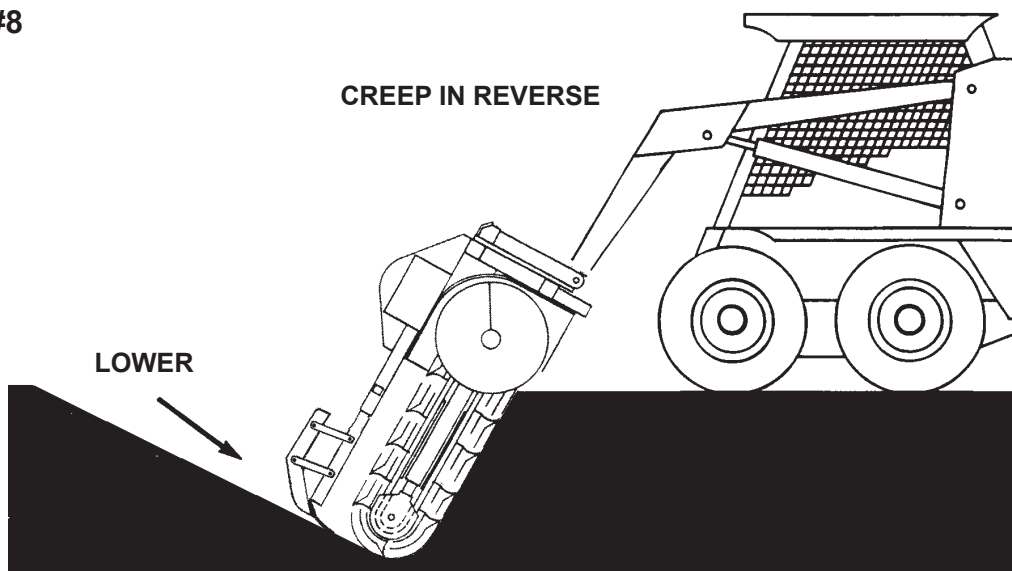


Once the crumber end has "bottomed out", begin slowly creeping the skid steer in re-verse while continuing to lower the loader arms. When nearing the required depth, stop lowering and tilt the trencher to a 60° to 65° angle. A 60° - 65° angle works best for general trenching. (See Figure #8)

WARNING! Be alert to what is happening around you. Look behind you before reversing the skid steer to trench. Be aware of any person or thing in the path of the skid steer. Observe any terrain changes such as drop-offs or soft ground.



FIGURE #8



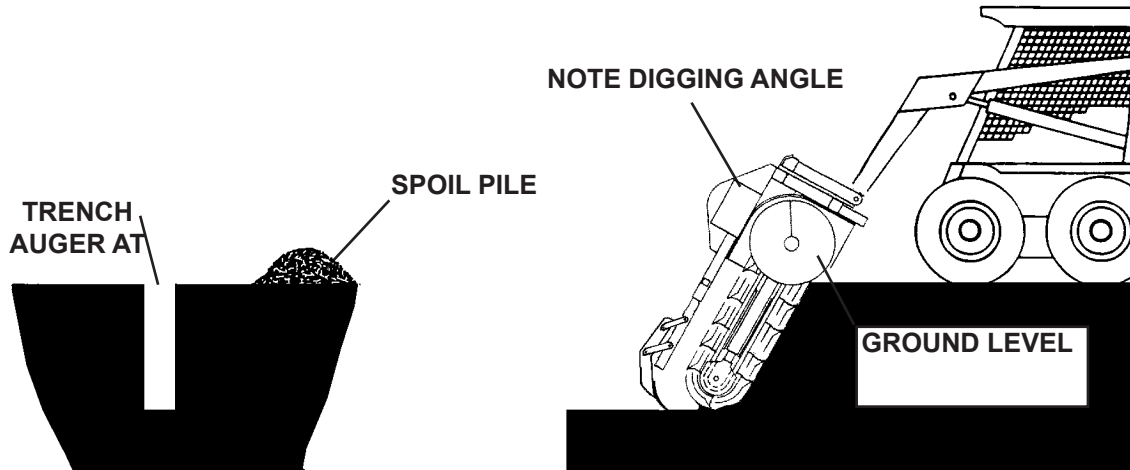
OPERATION

OPERATING TECHNIQUES

ROCK TRENCHER

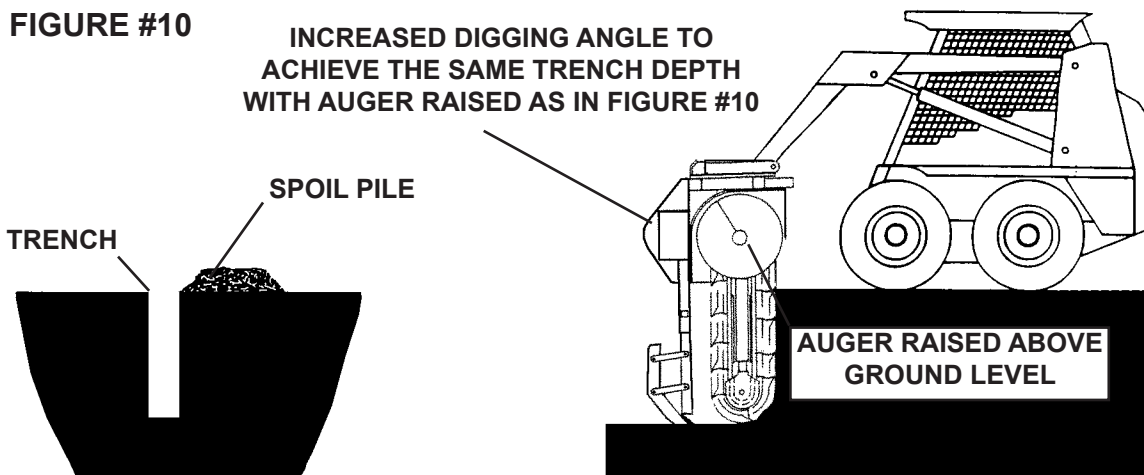
When trenching, remember to keep in mind the spoil placement. Position the trencher so that the auger floats at ground level to move spoil away from the trench. (See Figure #9)

FIGURE #9



Raise the trencher so that the auger rides above the ground level to leave the spoil beside the trench. The higher the auger, the closer to the trench the spoil will be placed. You may find that it generally takes less power to run the digging chain if the auger runs 3" - 6" (inches) off the ground, and thus increasing the potential footage of trench produced per hour. The higher you want the auger, the more vertical you will have to tilt the trencher to achieve the same trench depth. (See Figure #10)

FIGURE #10



OPERATION

OPERATING TECHNIQUES

ROCK TRENCHER

With the desired trench depth reached, advance the skid steer throttle to the desired engine RPM (we suggest full throttle for maximum digging power). Continue creeping the skid steer in reverse. Monitor the skid steer hydraulic oil pressure and temperature gauges as you trench. If hydraulic oil temperature or pressure gets too high, reduce skid steer creeping speed to reduce the load on the auxiliary hydraulic system.

IMPORTANT: Trying to trench at a speed faster than the auxiliary hydraulic system can handle could cause the trencher to stall. Continued stalling in a short period of time can cause excessive oil temperature which can lead to pump failure. Do not try to trench too much too quickly. If oil temperature becomes too hot, stop the trencher and allow the oil to cool.

STALLING THE TRENCHER

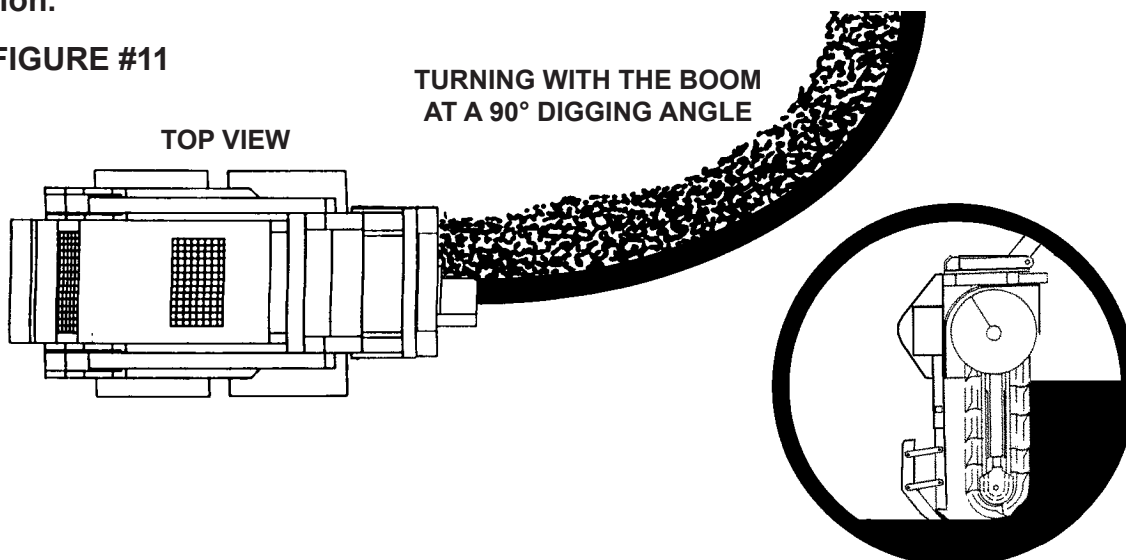
If the trencher stalls while digging, move the skid steer forward slightly to free the trencher. You may be able to free up the digging chain by changing its direction of travel with the auxiliary hydraulic controls. Repeated stalling of the trencher will cause oil to overheat rapidly and should be avoided.

TURNING WHILE TRENCHING

Gradual turns can be made while trenching. However, the tightness of the turn is directly proportional to the angle and length of the boom. In other words the greater the angle of the trencher boom to the ground level, the sharper the turn that can be trenched. (See Figures #11 & #12) Remember, the greater the increase in boom angle the higher the unit will have to be raised out of the trench to keep a unified trench depth. Shallow boom angles will severely limit turning ability.

IMPORTANT: Turning too tightly while trenching will cause the trencher to jam in the trench and stall, leading to excessive oil temperatures. Turning too tightly can also cause the trencher boom to bend. Take it easy when turning. Proceed slowly with caution.

FIGURE #11



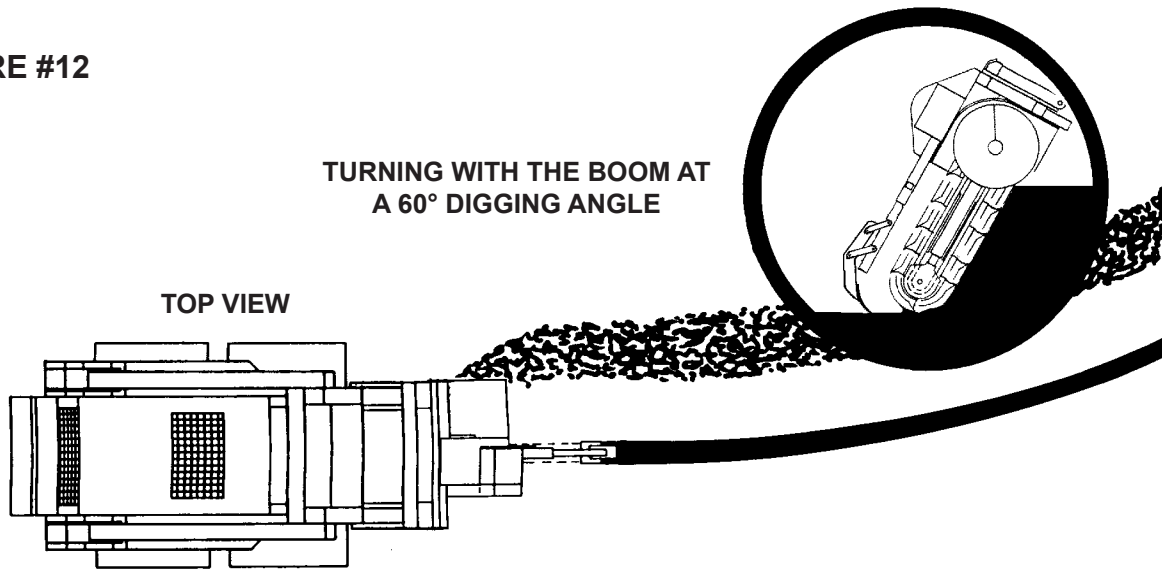
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OPERATION

OPERATING TECHNIQUES

ROCK TRENCHER

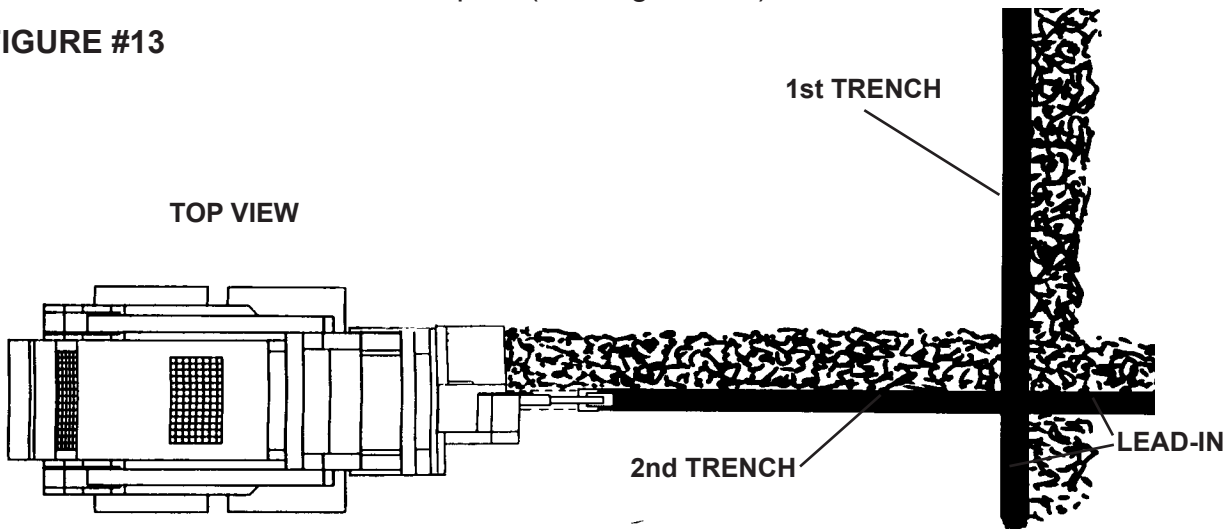
FIGURE #12



MAKING SHARP TURNS

To make sharp turns and 90° angles you will have to dig two trenches. Dig the first trench as you normally would. Then reposition the unit and dig the second trench at the appropriate angle. Be sure to take into account the extra lead-in space needed for the trencher to get down to the desired trench depth. (See Figure #13)

FIGURE #13



RECOMMENDED DIGGING ANGLES

A 90° digging angle is recommended for use in rock and frost conditions, and when trenching sharp corners. The 90° angle reduces excessive side pressure on the boom and digging chain when trenching corners.

A 60° - 65° digging angle is recommended for normal trenching. At this angle there will be less carry-over, and a cleaner trench bottom can be maintained than at a 90° angle.

OPERATION

OPERATING TECHNIQUES

ROCK TRENCHER

ENDING A TRENCH

When you have dug your trench, remember that the trencher boom is at an angle, and that you must continue trenching until the end of the boom has dug past the proposed end of the trench. Once the end of the trench has been dug, keep the trencher running and lift the skid steer loader arms to lift the unit clear of the trench. When the trencher has cleared the trench, disengage the auxiliary hydraulics to stop the trencher. Drive the skid steer away from the trench.

TRANSPORTING THE TRENCHER

When transporting the trencher, remember to keep the trencher as low to the ground as is practical. The lower the trencher rides, the more stable the skid steer will be. You do not want the trencher so low that the digging teeth touch the ground in rough terrain. Shut off the trencher before moving it away from the trench. Never transport the trencher around the job site or anywhere else while the digging chain is moving.

TRENCHER PERFORMANCE

Remember that your trencher's performance is directly related to the power available at you skid steer's auxiliary hydraulic system. If the trencher seems to lack power or speed, it may be due to your skid steer's lack of sufficient auxiliary power.

PREPARATION FOR STORAGE

- Clean the trencher thoroughly, removing all mud, dirt, and grease.
- Tighten all loose capscrews, nuts, and set screws.
- Coat the digging chain with a thin covering of oil. Operate chain for a short period to work the oil into the pins.
- Store the trencher in a dry and protected place. Leaving the trencher outside, exposed to the elements will materially shorten its life.
- Inspect for visible signs of wear, breakage or damage. Order any parts required and make necessary repairs to avoid delays when starting next season.
- Replace decals if damaged or in unreadable condition.
- Seal hydraulic system from contaminants and secure all hydraulic hoses off the ground to help prevent damage

Additional Precautions for Long Term Storage:

- Touch up unpainted and exposed areas with paint to prevent rust.

REMOVING FROM STORAGE

- Remove all protective coverings
- Check hydraulic hoses for deterioration and if necessary, replace.
- During cold weather, operate the trencher slowly for a short time before placing the unit under full load.

OPERATION

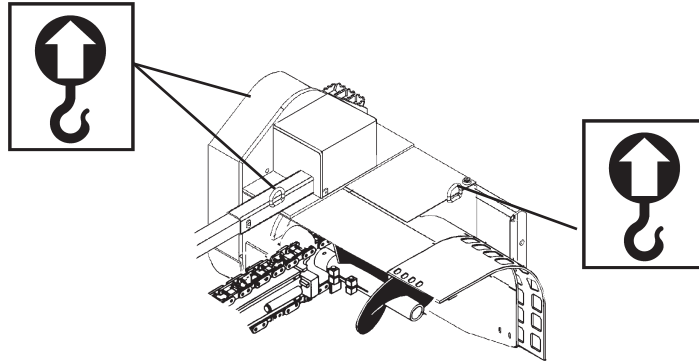
OPERATING TECHNIQUES

ROCK TRENCHER

LIFT POINTS

Lifting points are identified by lifting decals where required. Lifting at other points is unsafe and can damage attachment. Do not attach lifting accessories around cylinders or in any way that may damage hoses or hydraulic components.

- Attach lifting accessories to unit at recommended lifting points.
- Bring lifting accessories together to a central lifting point.
- Lift gradually, maintaining the equilibrium of the unit.



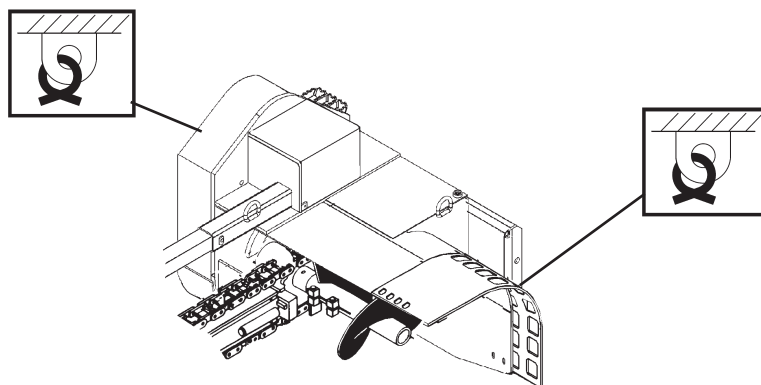
WARNING! Use lifting accessories (chains, slings, ropes, shackles and etc.) that are capable of supporting the size and weight of your attachment. Secure all lifting accessories in such a way to prevent unintended disengagement. Failure to do so could result in the attachment falling and causing serious personal injury or death.



TIE DOWN POINTS

Tie down points are identified by tie down decals where required. Securing to trailer at other points is unsafe and can damage attachment. Do not attach tie down accessories around cylinders or in any way that may damage hoses or hydraulic components.

- Attach tie down accessories to unit as recommended.
- Check unit stability before transporting.



WARNING! Verify that all tie down accessories (chains, slings, ropes, shackles and etc.) are capable of maintaining attachment stability during transporting and are attached in such a way to prevent unintended disengagement or shifting of the unit. Failure to do so could result in serious personal injury or death.



DIGGING CHAIN

GENERAL INFORMATION

This section is devoted to some basic information about the trencher and its digging components that you should know before you try to order any replacement parts. This information is given here for your convenience. With it you will be able to better understand the rest of this section.

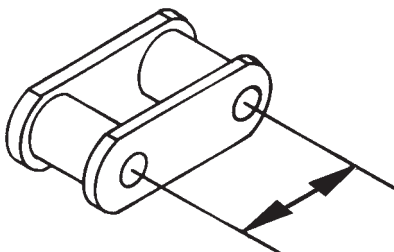
CHAIN PITCH

The digging chain may be divided into groups by pitch. The pitch of the chain is the distance between the centers of the holes in the chain links (See Figure 1). The word pitch can also be used to describe the length of the chain.

The 655 Trencher has a heavy weight chain with a tensile strength of 50,000 pounds and a pitch of 2.00".

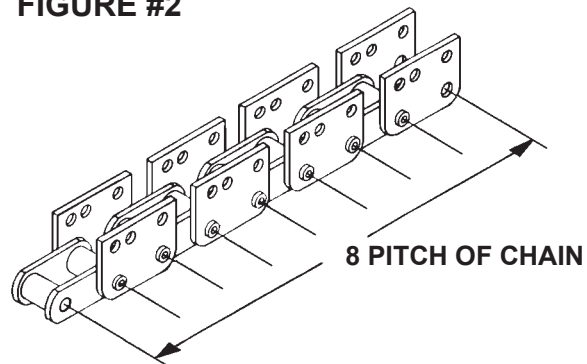
There is one thing that you must understand about chain pitch. You can not intermix components of different pitches. You cannot substitute chain links of different pitches in a digging chain. Nor can you use a digging chain of one pitch, with a driver sprocket of a different pitch. Attempting to do so will cause the chain to "jump" off the sprocket continuously.

FIGURE #1



DISTANCE BETWEEN HOLE CENTERS = PITCH

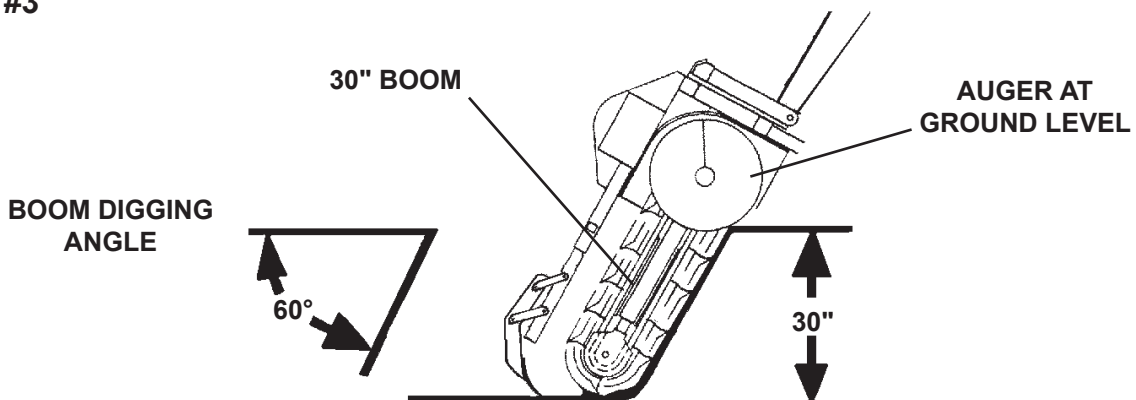
FIGURE #2



COMPONENT SIZE

The size of the digging component is based on the depth of the trench it will dig with auger at ground level and a 60° boom digging angle (See Figure 3). For example, a 30" boom is not necessarily 30" long. The 30" length means it will dig a trench 30" deep with the augers in their float position and at a 60° digging angle.

FIGURE #3

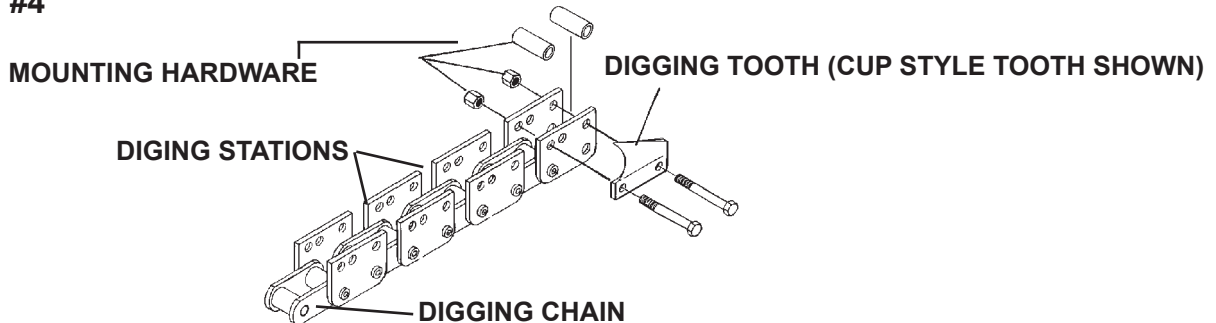


DIGGING CHAIN

DIGGING STATIONS

Digging chains are made up of a series of individual links pinned together. Every link has a special "Digging Station" link. These links are designed so that the digging teeth can be attached to the basic chains (See Figure 4). Digging chains may be purchased in any length, with or without teeth. All chains, teeth, spacers and assorted digging hardware may be purchased separately.

FIGURE #4

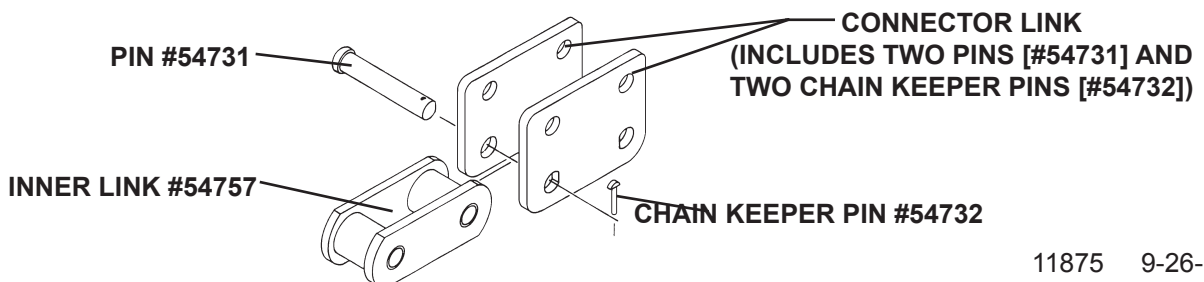


This completes the basic information on digging chain options. The rest of this section contains specific information on the digging chain and parts available, complete with part numbers.

655 TRENCHER CHAIN

Your trencher comes complete with the digging chain and crumber assembly. Chain #116352 is for a 30" boom and is 8" wide X 2.00" pitch, 24 Stations (46 pitches). You can purchase individual chain links and pins to repair a damaged chain. Below is a diagram of the chain's basic components with their descriptions and corresponding part numbers. Use these numbers when ordering replacement parts. You can also order a complete bare chain (without teeth or spacers) in any length desired. The chain is ordered under part number #79018 for a 2.00" Pitch. Just specify the length you want in pitches. (NOTE: your chain is 46 Pitches.)

When pinning links of chain together, first tap the pin through the connector link with the perfectly round holes and then on through the inner link. Place the second connector link in position, you will note that the end of the pin has one side flattened. Rotate the pin until its flat side lines up with the corresponding flat side of the connector link hole and tap the pin on through. Place the chain keeper pin into the hole at the end of the main pin and tap down tight. Finally bend the end of the keeper pin over to secure it in place.



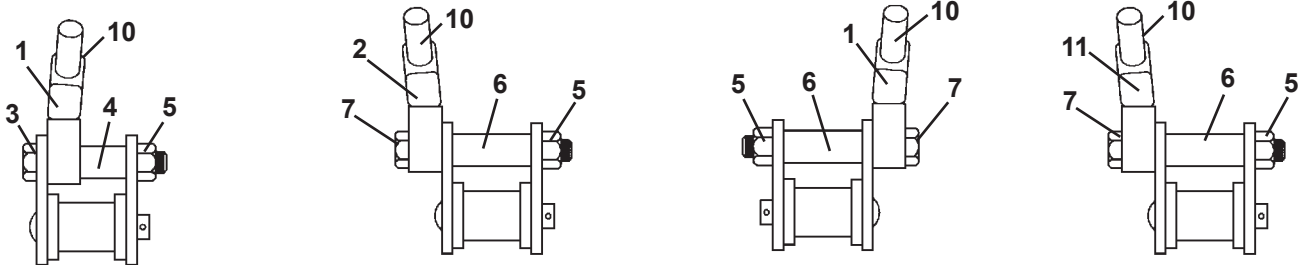
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DIGGING CHAIN

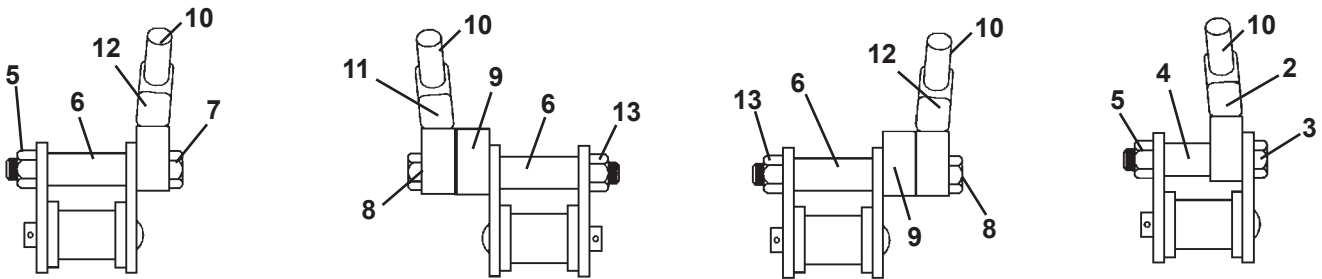
655 TRENCHER ROCK CHAIN #116352

Every second link on a digging chain is a special link called a digging station. These digging station links are designed so that digging teeth can be bolted onto them in a variety of configurations. It is the number and the make up of these different digging stations that make each chain unique.

STATION NO. 1, 8, 16	STATION NO. 2, 10, 18	STATION NO. 3, 11, 19	STATION NO. 4, 12, 20
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STATION NO. 5, 13, 21	STATION NO. 6, 14, 22	STATION NO. 7, 15, 23	STATION NO. 9, 17
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<u>NO</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	83802	Carbide Bit Holder - 4" Right
2	83801	Carbide Bit Holder - 4" Left
3	1347	.50" UNF X 3.25" Hex Capscrew
4	83798	Tube Spacer (Inside Mount)
5	1692	.50" UNC Hex Nut
6	54440	Tube Spacer (Outside Mount)
7	1349	.50" UNC X 3.75" Hex Capscrew
8	1351	.50" UNC X 4.50" Hex Capscrew
9	54439	Spacer
10	51547	Carbide Bit
11	83805	Carbide Bit Holder - 6" Left (2) Weld Spot on Top for Identifying Purposes
12	83806	Carbide Bit Holder - 6" Right (2) Weld Spot on Top for Identifying Purposes
13	10253	.50" UNF Center Lock Hex Nut

MAINTENANCE

GENERAL INFORMATION

Your trencher was designed to be virtually maintenance free. Very little effort is needed to keep it in top condition. It is however important to follow these procedures to get full performance and longevity out of the trencher.

LUBRICATION

The only lubrication your trencher needs is the greasing of the headshaft end bearing. The bearing should be lubricated with an SAE multi-purpose grease every 8 hours of operation. A grease zerk is installed in the bearing to facilitate this task.

NOTE: Not all trenchers require lubricating of the headshaft bearing. Some units have a sealed bearing that requires no maintenance. These units can be identified by the absence of a grease zerk in the bearing.

IMPORTANT: **DO NOT** lubricate any other part of the trencher! Lubricating parts such as the digging chain or the idler wheel will only attract dirt, resulting in increased wear.

EVERY 40 HOURS OF OPERATION

Every 40 hours of operation the trencher should be inspected for loose nuts, capscrews, bearings etc. Tighten as required, replace where necessary. Clean equipment of all dirt, oil, grease, etc. This will assist you in making visual inspections and help avoid overlooking worn or damaged components. Keep all safety decals clean and legible. Replace if damaged or worn.

EVERY 100 HOURS OF OPERATION

After the first 8 hours of operation and then at 100 hour intervals the trencher drive chain should be checked for proper tension adjustment. Chain is properly adjusted when the long side of the chain can be moved by hand 1/2" either way from centerline of chain. Improper adjustment will cause excessive wear on the drive chain and drive sprockets.

DIGGING TOOTH REPLACEMENT

Sharp teeth are important to good performance. When teeth wear out, production will drop sharply, increasing wear and tear on other components. The carbide tips should be replaced if they are broken, worn, flat spot or are seized in the bit holder and do not rotate freely.

WARNING! Always wear safety glasses with side shields when striking metal. Failure to heed could result in serious injury to the eyes or other parts of the body. **DO NOT** attempt to check the picks with the rock saw in a raised and unsupported position.



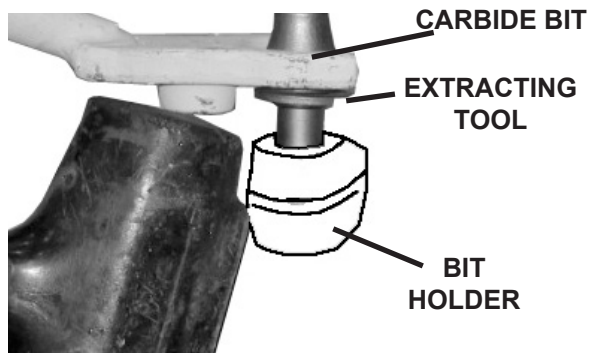
MAINTENANCE

1. Position the carbide bits to the top portion of the chain and then lower the chain to the ground to prevent any inadvertent movement.
2. The bits can be removed using an extraction tool that can be ordered from the manufacturer (Part #100213), or by using a chisel and lead hammer or rubber headed mallet.
3. **Using a chisel and hammer:** Position the chisel in the bottom of the carbide bit holder and hit with the hammer to remove the carbide bit.
4. Install the new carbide bit by positioning the bit in the holder and striking the carbide tip with a lead hammer or rubber headed mallet.

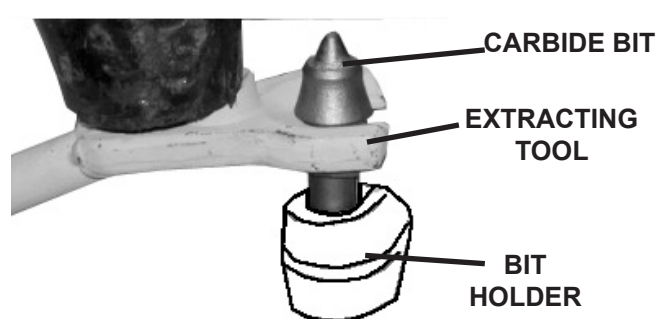
NOTE: The bit is properly seated when its shoulder is against the face of the bit holder. Check to be sure the bit rotates freely.

5. **Using the extraction tool:** Hold the extracting tool in one hand and place the jaws in the groove of the bit, with the offset handle pointing away from the bit holder.
6. Using a lead hammer or rubber-headed mallet, hit the raised pad on the tool until the bit starts to move. Continue tapping until the bit is removed.
7. Insert the new bit into the jaws of the extracting tool so that the raised pad of the tool is pointing in the same direction as the bit point.
8. Position the new bit in the carbide bit holder on the chain and with a lead hammer or rubber-headed mallet, hit the raised pad of the tool to start the bit into the bit holder. (Clean out any foreign material from the bit holder before installing the new bit.)
9. Once the bit is started into the bit holder strike the tool pad one strong blow to pop the bit into the holder.

BIT REMOVAL



BIT INSTALLATION



NOTE: The bit is properly seated when its shoulder is against the face of the bit holder. Check to be sure the bit rotates freely.

TROUBLESHOOTING

655 TRENCHER

GENERAL INFORMATION

Your trencher was designed to be as simple and as trouble free as possible. The purpose of this section is to help you in the event that a problem does develop. Why we cannot possibly cover every problem that might occur, you will find that those that are most common are covered here.

PROBLEM: DIGGING CHAIN WILL NOT TURN

POSSIBLE CAUSE AND REMEDY:

1. Quick coupler not completely engaged. Check to see that all couplers are matched pairs and engaged correctly.
2. Quick coupler failure. Check couplers for dirt, rust, or other contaminants that could effect coupler engagement. Clean or replace couplers as needed.
3. Obstruction in hydraulic hose. Remove hydraulic hoses and couplers one at a time and check flow through hose by blowing through the hose or by pouring hydraulic fluid through the hose. Clean or replace hose as needed.
4. Skid steer relief valve stuck open. Have relief valve serviced and checked by an authorized dealer.
5. Skid steer auxiliary valve not operating properly. See skid steer operator's manual or dealer for information and help.
6. Hydraulic motor failed. Be sure you have hydraulic flow to the motor. If oil flow to motor is good, but motor will still not turn when detached from trencher headshaft, remove motor and have it serviced or replaced as needed.
7. Headshaft bearings failed. Inspect headshaft bearings for free movement. Check for binding or foreign matter jamming bearing. Clean or replace as necessary.
8. Boom end bearing failed. Inspect boom end bearing for free movement. Check for binding or foreign matter jamming bearing. Clean or replace as necessary.

TROUBLESHOOTING

655 TRENCHER

9. Digging chain to tight. Digging chain should only be tight enough to remain on sprockets while turning under load. There should be some sag in the chain. If too tight, loosen chain by the adjusting nut(s) on the boom.
10. Sand build-up in tooth root of sprocket. Sand can build up in the sprockets effectively increasing the chain tension. Raise the boom out of the ditch and reverse the digging chain on the trencher, then run the trencher out of the trench to clear the sprockets. Reinstall the chain in its correct digging direction and readjust chain tension.
11. Digging sprocket clamp loose on headshaft. Observe if the headshaft is turning. If shaft is turning but sprocket is not, stop the trencher and tighten the sprocket clamp.

PROBLEM: TRENCHER DOES NOT DIG FAST ENOUGH

POSSIBLE CAUSE AND REMEDY:

1. Digging teeth worn. See maintenance section in this manual. Inspect teeth and replace as needed.
2. Skid steer relief valve set too low. See skid steer operator's manual and or dealer for proper relief valve service and adjustment.
3. Quick coupler or hose restriction. Inspect couplers and hoses for dirt, rust, and other contaminants and repair or replace as needed.
4. Hydraulic system over heating. Shut the trencher and skid steer down and allow oil to cool. Repeated stalling of the trencher will cause the oil to over heat. Avoid excessive stalling.
5. Cutting a ditch size beyond the ability of the skid steer. Your trencher is powered by oil from the skid steers auxiliary hydraulic system. The horsepower transmitted through the auxiliary hydraulics is substantially less than that of the engine.

PROBLEM: HYDRAULIC OIL OVER HEATING

POSSIBLE CAUSE AND REMEDY:

1. Skid steer relief valve set too low. See skid steer operator's manual and/or dealer for proper relief valve service and adjustment.
2. Quick coupler or hose restriction. Inspect couplers and hoses for dirt, rust, and other contaminants and repair or replace as needed.

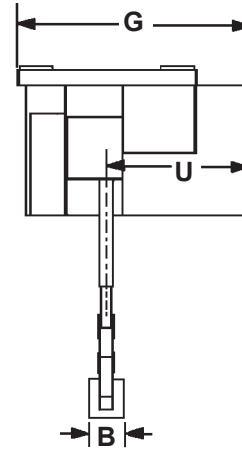
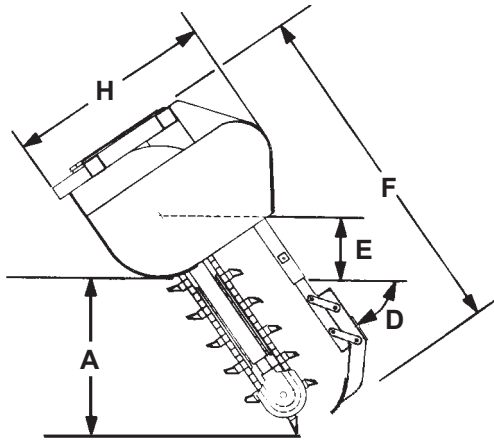
TROUBLESHOOTING

655 TRENCHER

3. Motor or hose size not balanced to skid steer. A hose or a motor that is too small can cause added internal friction and resultant heat build-up.
4. Skid steer not equipped with oil cooler or sufficient sump capacity. Check with your skid steer dealer for information and availability of auxiliary cooling and sump kits. Install if available. If not available stop skid steer and trencher and allow them to cool when they get too hot.

SPECIFICATIONS

655 ROCK TRENCHER



SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE AND WITHOUT LIABILITY THEREFORE. WHENEVER APPLICABLE SPECIFICATIONS ARE IN ACCORDANCE WITH SAE STANDARDS.

DESCRIPTION	SPECIFICATION
A. Trench Depth w/auger touching ground At 65° Digging Angle(30" Boom)	30.00"
B. Trench Width	8.00"
D. Recommended Trenching Angle	65°
E. Headshaft Height.....	11.25"
F. Trencher Length (30" Boom)	58.00"
G. Trencher Width	43.00"
H. Trencher Height.....	37.00"
U. Spoil Discharge Reach	27.00"
Distance From Centerline Drive Sprocket To Back Of Mounting Frame	16.00"
Hydrostatic Motor	35 Cu. In. Displacement
Hydraulic System	
Pump Requirements.....	22-40 GPM
Maximum System Pressure.....	3500 PSI
Weight	1166#




BOLT TORQUE SPECIFICATIONS

GENERAL TORQUE SPECIFICATION TABLES

Use the following charts when determining bolt torque specifications when special torques are not given. Always use grade 5 or better when replacing bolts.




SAE BOLT TORQUE SPECIFICATIONS

NOTE: The following torque values are for use with extreme pressure lubricants, plating or hard washer applications. Increase torque 15% when using hardware that is unplated and either dry or lubricated with engine oil.

Bolt Size		SAE GRADE 5 TORQUE				SAE GRADE 8 TORQUE				Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary
		Pounds Feet		Newton-Meters		Pounds Feet		Newton-Meters		
Inches	Millimeters	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	
1/4	6.35	8	9	11	12	10	13	14	18	<p>GRADE 2</p>  <p>GRADE 5</p>  <p>GRADE 8</p> 
5/16	7.94	14	17	19	23	20	25	27	34	
3/8	9.53	30	36	41	49	38	46	52	62	
7/16	11.11	46	54	62	73	60	71	81	96	
1/2	12.70	68	82	92	111	94	112	127	152	
9/16	14.29	94	112	127	152	136	163	184	221	
5/8	15.88	128	153	174	207	187	224	254	304	
3/4	19.05	230	275	312	373	323	395	438	536	
7/8	22.23	340	408	461	553	510	612	691	830	
1	25.40	493	592	668	803	765	918	1037	1245	
1-1/8	25.58	680	748	922	1014	1088	1224	1475	1660	
1-1/4	31.75	952	1054	1291	1429	1547	1700	2097	2305	
1-3/8	34.93	1241	1428	1683	1936	2023	2312	2743	3135	
1-1/2	38.10	1649	1870	2236	2535	2686	3026	3642	4103	

METRIC BOLT TORQUE SPECIFICATIONS

NOTE: The following torque values are for use with metric hardware that is unplated and either dry or lubricated with engine oil. Reduce torque 15% when using hardware that has extreme pressure lubricants, plating or hard washer applications.

Bolt head identification marks as per grade.		
		

Size of Bolt	Grade No.	Pitch (mm)	Pounds Feet	Newton-Meters	Pitch (mm)	Pounds Feet	Newton-Meters
M6	5.6	1.0	3.6-5.8	4.9-7.9	-	-	-
	8.8		5.8-4	7.9-12.7		-	-
	10.9		7.2-10	9.8-13.6		-	-
M8	5.6	1.25	7.2-14	9.8-19	1.0	12-17	16.3-23
	8.8		17-22	23-29.8		19-27	25.7-36.6
	10.9		20-26	27.1-35.2		22-31	29.8-42
M10	5.6	1.5	20-25	27.1-33.9	1.25	20-29	27.1-39.3
	8.8		34-40	46.1-54.2		35-47	47.4-63.7
	10.9		38-46	51.5-62.3		40-52	54.2-70.5
M12	5.6	1.75	28-34	37.9-46.1	1.25	31-41	42-55.6
	8.8		51-59	69.1-79.9		56-68	75.9-92.1
	10.9		57-66	77.2-89.4		62-75	84-101.6
M14	5.6	2.0	49-56	66.4-75.9	1.5	52-64	70.5-86.7
	8.8		81-93	109.8-126		90-106	122-143.6
	10.9		96-109	130.1-147.7		107-124	145-168
M16	5.6	2.0	67-77	90.8-104.3	1.5	69-83	93.5-112.5
	8.8		116-130	157.2-176.2		120-138	162.6-187
	10.9		129-145	174.8-196.5		140-158	189.7-214.1
M18	5.6	2.0	88-100	119.2-136	1.5	100-117	136-158.5
	8.8		150-168	203.3-227.6		177-199	239.8-269.6
	10.9		175-194	237.1-262.9		202-231	273.7-313
M20	5.6	2.5	108-130	146.3-176.2	1.5	132-150	178.9-203.3
	8.8		186-205	252-277.8		206-242	279.1-327.9
	10.9		213-249	288.6-337.4		246-289	333.3-391.6

Limited Warranty

Except for the Excluded Products as described below, all new products are warranted to be free from defects in material and/or workmanship during the Warranty Period, in accordance with and subject to the terms and conditions of this Limited Warranty.

1. Excluded Products. The following products are excluded from this Limited Warranty:

(a) Any cable, part that engages with the ground (i.e. sprockets), digging chain, bearing, teeth, tamping and/or demolition head, blade cutting edge, pilot bit, auger teeth and broom brush that either constitutes or is part of a product.

(b) Any product, merchandise or component that, in the opinion of Paladin Light Construction¹, has been (i) misused; (ii) modified in any unauthorized manner; (iii) altered; (iv) damaged; (v) involved in an accident; or (vi) repaired using parts not obtained through Paladin Light Construction.

2. Warranty Period. The Limited Warranty is provided only to those defects that occur during the Warranty Period, which is the period that begins on the first to occur of: (i) the date of initial purchase by an end-user, (ii) the date the product is first leased or rented, or (iii) the date that is six (6) months after the date of shipment by Paladin Light Construction as evidenced by the invoiced shipment date (the "Commencement Date") and ends on the date that is twelve (12) months after the Commencement Date.

3. Terms and Conditions of Limited Warranty. The following terms and conditions apply to the Limited Warranty hereby provided:

(a) Option to Repair or Replace. Paladin Light Construction shall have the option to repair or replace the product.

(b) Timely Repair and Notice. In order to obtain the Limited Warranty, (i) the product must be repaired within thirty (30) days from the date of failure, and (ii) a claim under the warranty must be submitted to Paladin Light Construction in writing within thirty (30) days from the date of repair.

(c) Return of Defective Part or Product. If requested by Paladin Light Construction, the alleged defective part or product shall be shipped to Paladin Light Construction at its manufacturing facility or other location specified by Paladin Light Construction, with freight PRE-PAID by the claimant, to allow Paladin Light Construction to inspect the part or product.

Claims that fail to comply with any of the above terms and conditions shall be denied.

LIMITATIONS AND EXCLUSIONS.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY BASED ON A COURSE OF DEALING OR USAGE OF TRADE.

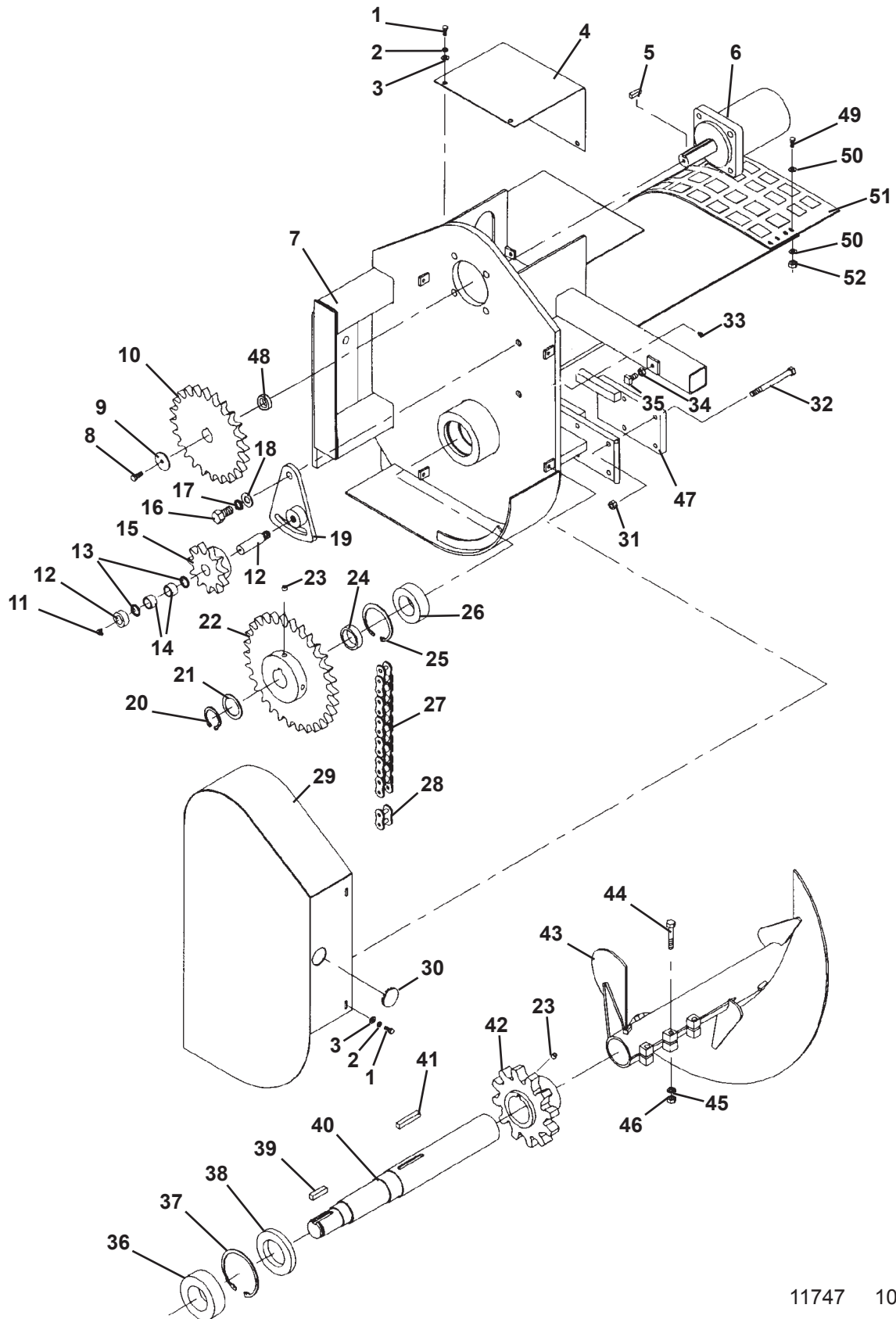
IN NO EVENT SHALL PALADIN LIGHT CONSTRUCTION BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES.

IN NO EVENT SHALL PALADIN LIGHT CONSTRUCTION BE LIABLE FOR ANY LOSS OR CLAIM IN AN AMOUNT IN EXCESS OF THE PURCHASE PRICE, OR, AT THE OPTION OF PALADIN LIGHT CONSTRUCTION, THE REPAIR OR REPLACEMENT, OF THE PARTICULAR PRODUCT ON WHICH ANY CLAIM OF LOSS OR DAMAGE IS BASED. THIS LIMITATION OF LIABILITY APPLIES IRRESPECTIVE OF WHETHER THE CLAIM IS BASED ON BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE OR OTHER CAUSE AND WHETHER THE ALLEGED DEFECT IS DISCOVERABLE OR LATENT.

¹Attachment Technologies Inc., a subsidiary of Paladin Brands Holding, Inc. (PBHI) is referred to herein as Paladin Light Construction.

TRENCHER ASSEMBLY

655 ROCK TRENCHER ASSEMBLY #30130-0000



11747 10-10-11-2

TRENCHER ASSEMBLY

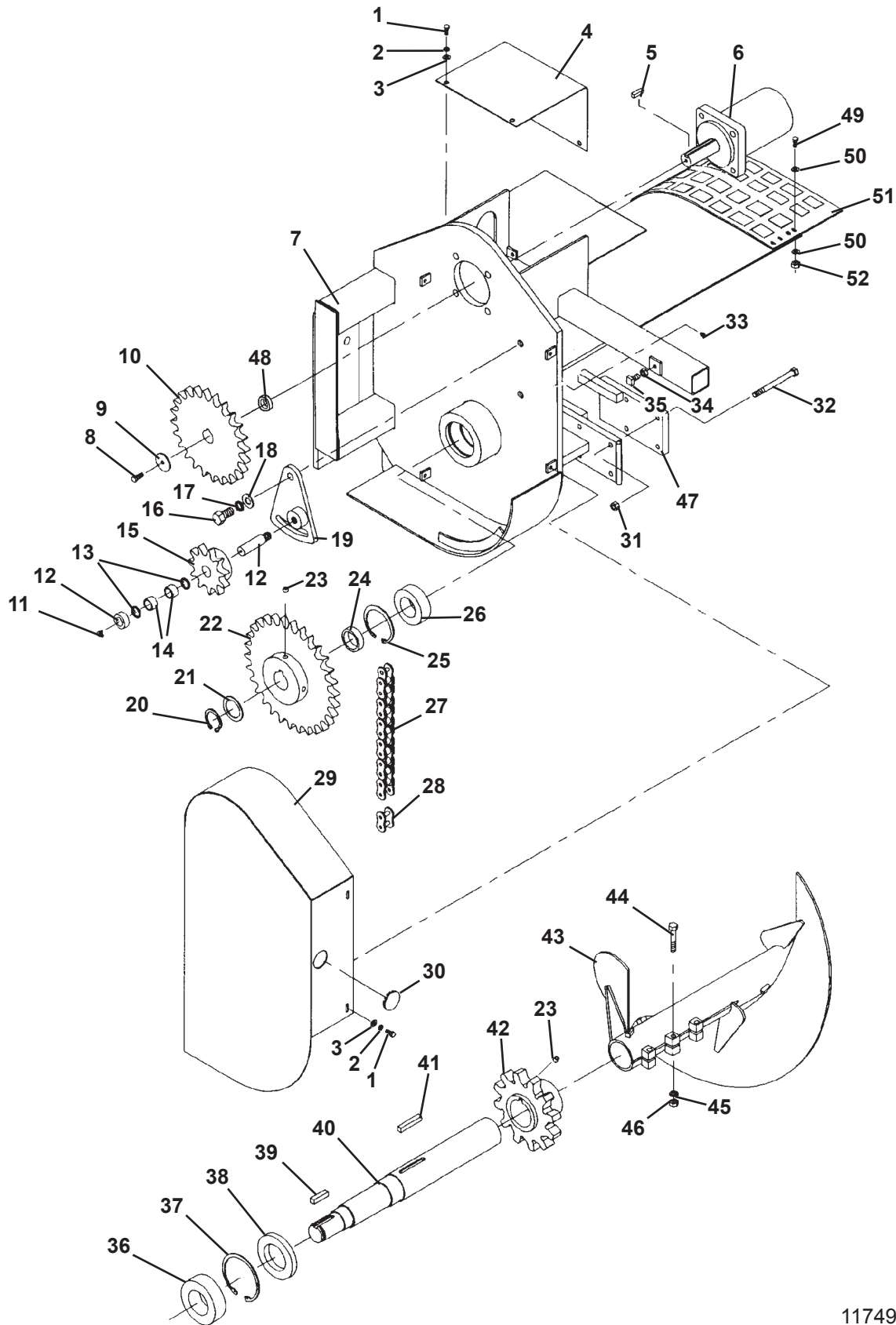
655 ROCK TRENCHER ASSEMBLY #30130-0000

<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	8	1021	.31" UNC X .75" Hex Capscrew
2	8	1502	.31" Lock Washer
3	8	1513	.31" Flat Washer
4	1	80378	Motor Cover
5	1	2006305	Replacement Key
6	1	116350	Motor
		45612	Replacement Shaft Seal Kit
	4	1093	.50" UNC X 2.25" Hex Capscrew
	4	1505	.50" Lock Washer
	4	1228	.50" UNC Hex Nut
7	1	116344	Mainframe
8	1	2688	M12 X 50mm Capscrew
9	1	80403	Washer
10	1	116351	16 Tooth Sprocket
11	1	53031	90° Grease Zerk
12	1	80339	Tightener Shaft with Collar
13	2	45602	Seal
14	2	80388	Bearing
15	1	80338	11 Tooth Sprocket
16	2	1137	.75" UNC X 1.50" Hex Capscrew
17	2	1507	.75" Lock Washer
18	2	1518	.75" Flat Washer
19	1	80344	Chain Tightener
20	1	1901	Snap Ring
21	As Req'd	78198	Thrust Washer
22	1	80333	30 Tooth Sprocket
23	5	1572	Set Screw
24	1	80368	Spacer
25	1	1601	Snap Ring
26	1	8085	Bearing
27	1	80428	16 Tooth Sprocket Drive Chain (52 Pitches) (Includes 1 Connector Link Item #29)
28	1	67451	Connector Link
29	1	80369	Chain Cover
30	1	7096	Button Plug

11748 10-10-11-2

TRENCHER ASSEMBLY

655 ROCK TRENCHER ASSEMBLY #30130-0000



TRENCHER ASSEMBLY

655 ROCK TRENCHER ASSEMBLY #30130-0000

<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
31	4	1542	.50" UNC Nylock Nut
32	2	1242	.50" UNC Hex Jam Nut
33	2	1769	.50" UNC X 1.00" Square Head Set Screw
34	1	6616	Grease Zerk
35	4	1984	.50" UNC X 5.50" Hex Capscrew GR 8
36	1	80340	Bearing
37	1	1710	Snap Ring
38	1	80366	Dirt Guard
39	1	53744	Key .50" Square X 2.00"
40	1	80352	Headshaft
41	1	80367	Key .50" Square X 3.00"
42	1	86213	Drive Sprocket
43	1	80381	Auger
44	3	1095	.50" UNC X 2.75" Hex Capscrew
45	3	1505	.50" Lock Washer
46	3	1228	.50" UNC Hex Nut
47	1	116435	Boom Clamp
48	1	116972	Motor Sprocket Spacer
49	6	1043	.38" UNC X 1.00" Hex Capscrew
50	12	1800	.38" Hard Flat Washer
51	1	116436	Auger Guard Shield
52	6	1837	.38" UNC Deformed Lock Nut

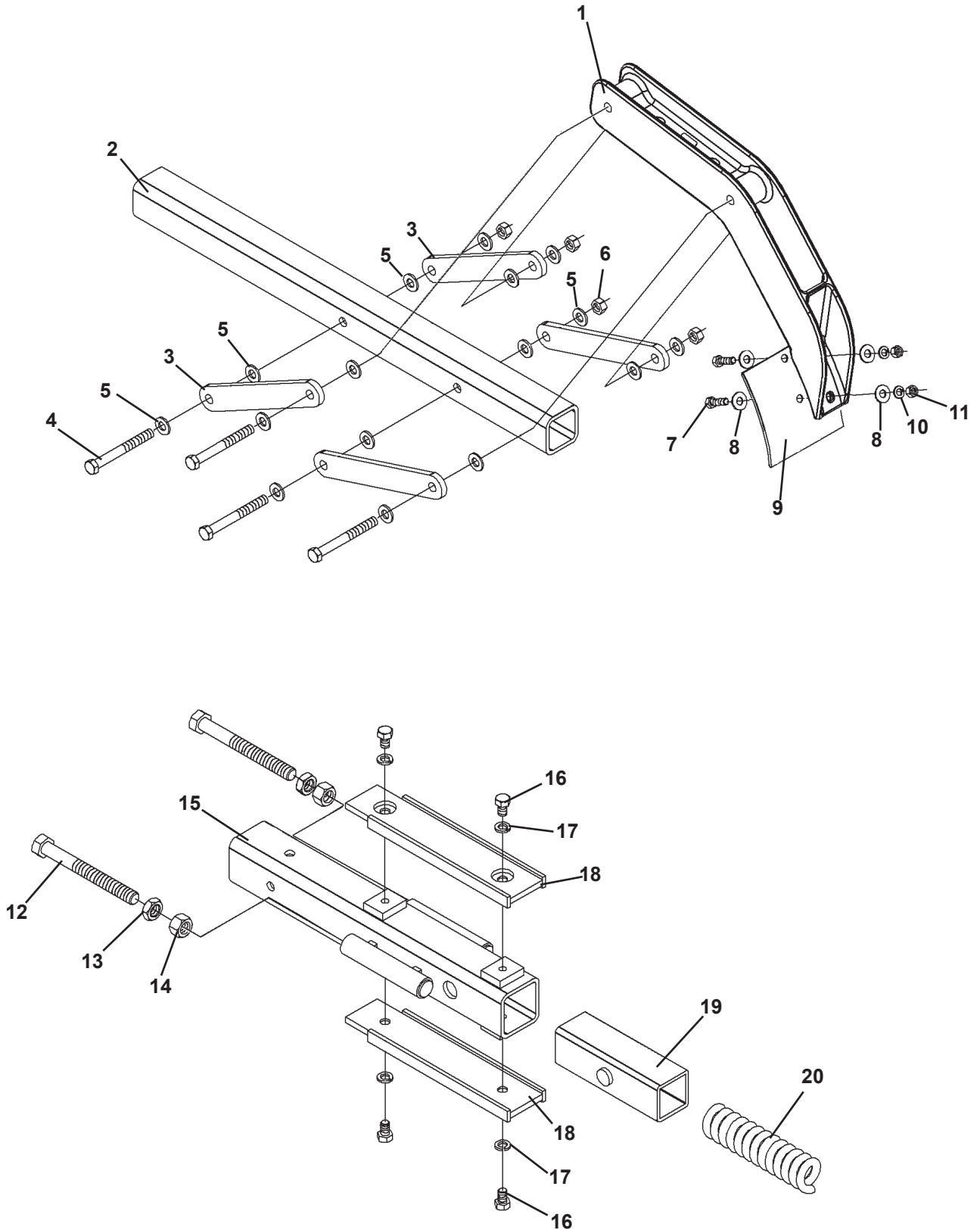
Assembly #30130-0000 also includes:

1	116352	Trencher Chain Assembly
1	116312	Boom and Crumber Assembly
1	53055	Crumber Shoe

TRENCHER ASSEMBLY

655 ROCK TRENCHER ASSEMBLY #30130-0000

30" BOOM AND CRUMBER ASSEMBLY #116312



11844 9-19-11

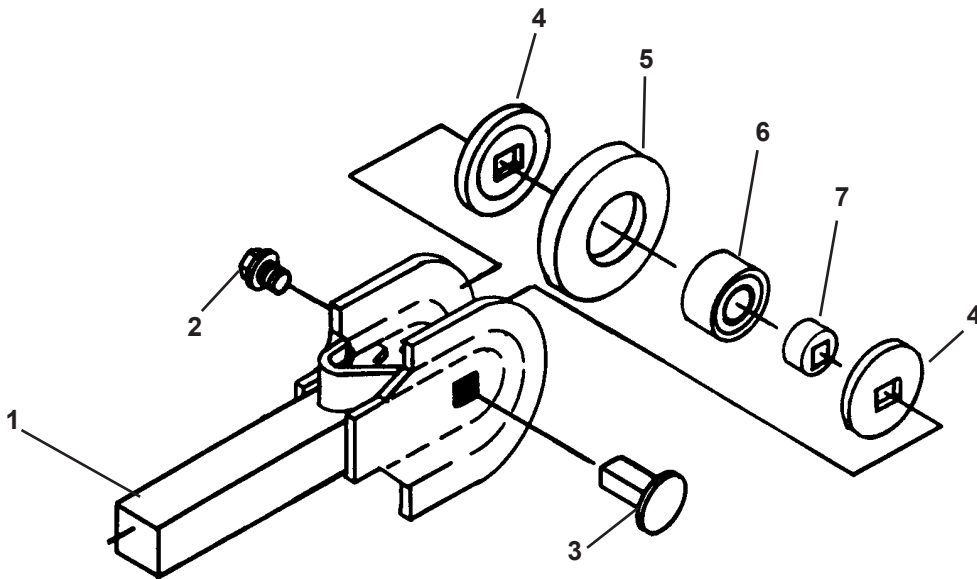
TRENCHER ASSEMBLY

655 ROCK TRENCHER ASSEMBLY #30130-0000

30" BOOM AND CRUMBER ASSEMBLY #116312

<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	86278	Crumber End
2	1	89276	Crumber Bar
3	4	21031	Lever Arm
4	4	1101	.50" UNC X 4.50" Hex Capscrew
5	16	1646	.50" Hard Flat Washer
6	4	1841	.50" UNC Deformed Lock Nut
7	2	1044	.38" UNC X 1.25" Hex Capscrew
8	4	1514	.38" Flat Washer
9	1	53055	Crumber Shoe (Located in the Trencher Assembly)
10	2	1503	.38" Lock Washer
11	2	1226	.38" UNC Hex Nut
12	2	62702	Chain Tightening Bolt
13	2	1245	.75" UNC Hex Jam Nut
14	2	1231	.75" UNC Hex Nut
15	1	116348	Boom - 30"
16	4	1087	.50" UNC X .75" Hex Capscrew
17	4	1505	.50" Lock Washer
18	2	53115	Wear Strip
19	1	53138	Bushing
20	1	53188	Spring

TRENCHER ASSEMBLY
655 ROCK TRENCHER ASSEMBLY #30130-0000
BOOM END



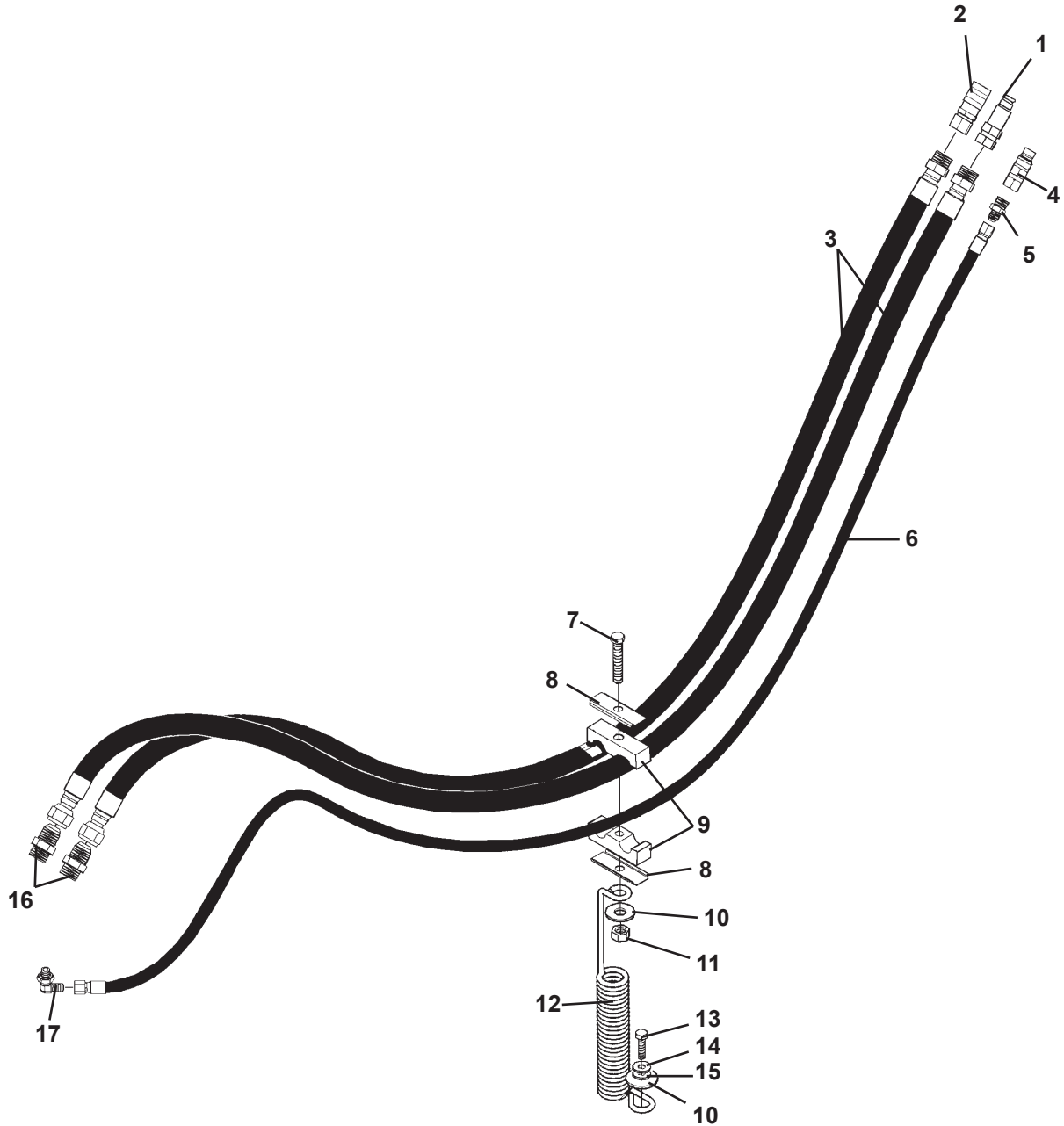
TRENCHER ASSEMBLY
655 ROCK TRENCHER ASSEMBLY #30130-0000
BOOM END

<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	80032	Boom End
2	1	1548	.75" UNC X 1.25" Nylock Capscrew
3	1	53132	1.12" Square Pin
4	2	54067*	Idler Spacer
5	1	79103*	Idler Wheel
6	1	8085*	Idler Bearing
7	1	53988*	Idler Bearing Hub

NOTE: Idler Roller Assembly Repair Kit #80868 includes all parts marked with an asterisk (*).

TRENCHER ASSEMBLY

655 ROCK TRENCHER ASSEMBLY #30130-0000
HOSE KITS



TRENCHER ASSEMBLY
 655 ROCK TRENCHER ASSEMBLY #30130-0000
 HOSE KITS

<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	22521	Male Quick Coupler .75" Body
	1	84922	Male Quick Coupler .62" Body
	1	22519	Male Quick Coupler .50" Body
2	1	22520	Female Quick Coupler .75" Body
	1	84921	Female Quick Coupler .62" Body
	1	22518	Female Quck Coupler .50" Body
3	2	37060	Hose Assembly .75" X 88" 12MBo-12FJX
4	1	84923	Male Quick Coupler .38" Body
	1	84928	Female Quick Coupler .38" Body
5	1	3269	Straight Connector 8MBo-6MJ
6	1	37152	Hose Assembly .25" X 88" 6FJX-6FJX
7	1	1031*	.50" UNC X 3.25" Hex Capscrew
8	2	22315*	Hose Clamp Plate
9	1	22317*	Hose Clamp Cushion .75" Hose
10	2	105840*	Fender Washer
11	1	1753*	.50" UNC Lock Nut
12	1	RHW8618*	Hose Clamp Spring
13	1	1020	.31" UNC X .50" Hex Capscrew
14	1	1502	.31" Lock Washer
15	1	1513	.31" Flat Washer
16	2	3419	Straight Adapter 12MBo-12MJ
17	1	3434	90° Elbow 6MBo-6MJ

NOTE: Due to the various different skid steer applications that the 655 Trenchers install on, all hose lengths and couplers are listed for your convenience.

* Hose Clamp Assembly #103455 contains all parts marked with an asterisk (*). Parts may be ordered separately.